

**From:** Whittaker, Laura [laura.whittaker@aptim.com]  
**Sent:** Thursday, September 13, 2018 4:16 AM  
**To:** Liscio, Matthew P CIV SEA 04, NAVSEA DET RASO [matthew.liscio@navy.mil]  
**CC:** Howard, Leslie A CIV NAVFAC SW [leslie.howard@navy.mil]; Fowler, Janet CIV NAVSEA, SEA 04N [janet.fowler1@navy.mil]; Johnson, Nels [Nels.Johnson@aptim.com]; Schul, Raymond [raymond.schul@aptim.com]; Guillory, Jeffrey [jeffrey.guillory@aptim.com]; Amy Mangel [amy.mangel@aptim.com]; Hanelt, Norm [Norm.Hanelt@aptim.com]; Killpack, Randall [randall.killpack@aptim.com]; Chi, Minhsec [minhsec.chi@aptim.com]; Orman, Sean [sean.orman@aptim.com]; Rogers, Bryon [bryon.rogers@aptim.com]  
**Subject:** [Non-DoD Source] Data package ready for review - HPNS PE-2, RSY B2 (DC)  
**Attachments:** HPNS APTIM RSY B2 (DC) Soil Non-LLRW Concurrence Request 09132018 (reduced).pdf

Mr. Liscio,

APTIM request RASO concurrence to designate this soil as Non-LLRW soil.

If there are any questions or if additional data is required, please contact me.

Thank you.

**LAURA WHITTAKER**  
Radiological Technician 4 (RCT IV)

**APTIM** | Radiation Safety

**M** 423 544 9145

**E** [laura.whittaker@aptim.com](mailto:laura.whittaker@aptim.com)



2410 Cherahala Blvd  
Knoxville, TN 37932

**APTIM.com**



## Hunters Point Naval Shipyard, Parcel E-2 RSY Data Report

Contract No. EMAC III CTO-0013					
RSY Pad: B2	RSY Pad Use Number: Deconstruction (DC)	First Submittal <input checked="" type="checkbox"/>	Second Submittal <input type="checkbox"/>		
Data attached and submitted by: Laura Whittaker		Data Report Submittal Date: 09/13/2018			

Soil Sample Data					
Sample Identification	Survey Location	Type of Sample	<sup>226</sup> Ra Final Analytical Results (pCi/g)	<sup>137</sup> Cs Final Analytical Results (pCi/g)	Total Sr Final Analytical Results (pCi/g)
		Upper limit of site reference background	1.633	0.113	0.331
PE2-RSYB2-DC-S001	1	Systematic	0.616	-0.00271	0.0237
PE2-RSYB2-DC-S002	2	Systematic	0.645	0.0154	N/A
PE2-RSYB2-DC-S003	3	Systematic	0.608	-0.0389	N/A
PE2-RSYB2-DC-S004	4	Systematic	0.719	0.041	N/A
PE2-RSYB2-DC-S005	5	Systematic	0.634	-0.0387	N/A
PE2-RSYB2-DC-S006	6	Systematic	0.643	-0.0351	N/A
PE2-RSYB2-DC-S007	7	Systematic	0.596	-0.0493	N/A
PE2-RSYB2-DC-S008	8	Systematic	0.625	-0.0417	N/A
PE2-RSYB2-DC-S009	9	Systematic	0.521	-0.0568	N/A
PE2-RSYB2-DC-S010	10	Systematic	0.744	0.0224	N/A
PE2-RSYB2-DC-S011	11	Systematic	0.907	-0.0591	0.0964
PE2-RSYB2-DC-S012	12	Systematic	0.591	-0.0544	N/A
PE2-RSYB2-DC-S013	13	Systematic	0.711	0.0124	N/A
PE2-RSYB2-DC-S014	14	Systematic	0.489	0.00173	N/A
PE2-RSYB2-DC-S015	15	Systematic	0.560	0.0184	N/A
PE2-RSYB2-DC-S016	16	Systematic	0.577	-0.0244	N/A
PE2-RSYB2-DC-S017	17	Systematic	0.415	0.0376	N/A
PE2-RSYB2-DC-S018	18	Systematic	0.529	0.0175	N/A
Biased Soil Sample Data					
PE2-RSYB2-DC-B-S001	1	Biased	0.701	-0.0134	N/A
PE2-RSYB2-DC-B-S002	2	Biased	0.631	0.0309	N/A
PE2-RSYB2-DC-B-S003	3	Biased	0.663	-0.0423	N/A
PE2-RSYB2-DC-B-S004	4	Biased	0.669	-0.0298	N/A
PE2-RSYB2-DC-B-S005	5	Biased	0.572	0.0347	N/A
PE2-RSYB2-DC-B-S006	6	Biased	0.772	-0.0141	N/A
PE2-RSYB2-DC-B-S007	7	Biased	0.681	0.0115	N/A
PE2-RSYB2-DC-B-S008	8	Biased	0.715	0.000	N/A

<sup>226</sup>Ra Radium-226<sup>137</sup>Cs Cesium-137

Sr Strontium

pCi/g Picocuries per gram

Instrument and Survey Data										
Activity	Survey #	Date	Meter	Calibration Due Date	Serial #	Reference Area Static Bkgd	Reference Area Static 3σ IL	Reference Area Scan Bkgd	Reference Area Scan 3σ IL	Range
RSI Gamma Walkover Survey	HPRS-07202018-PE2-ROV2-2806	07/20/2018	RS-701/RSX-1	N/A	Console: 7236 Detectors: 5447,5448	N/A	N/A	3,400 CPS	4,872 CPS	3,136-5,190* CPS
RSI Follow-up Static Survey	HPRS-07302018-PE2-JSS2-2849	07/30/2018	RS-701/RSX-1	N/A	Console: 7236 Detectors: 5447,5448	3,612 CPS	4,255 CPS	N/A	N/A	3,973-4,926* CPS
Systematic Sample Survey	HPRS-08012018-PE2-JSS-2870	08/01/2018	2221	06/29/2018	117634	15,069 CPM	17,241 CPM	N/A	N/A	14,481-19,575* CPM
Biased Sample Survey	HPRS-08022018-PE2-JSS-2878	08/02/2018	2221	06/29/2019	117634	15,069 CPM	17,241 CPM	N/A	N/A	20,044-21,895* CPM

+ Gamma readings exceeding the Reference Area 3σ IL are attributable to the presence of naturally-occurring non-Navy program radionuclides in the excavated soil—see Note(s) in the Summary table (page 2) for more details.

3σ IL Investigation Level (established at 3σ above the mean of the Reference Area dataset)

CPS Counts per second

CPM Counts per minute

Summary
1) RSI gamma walkover survey and data review—upon review of initial scan data, follow-up static investigations were deemed necessary, and investigation locations were identified as per the RSI Data Evaluation Process (pages 3-4). Gamma scan coverage is shown on the Systematic Sample Survey map (page 8). Contour maps of scan data are shown on RSI Data Plots (page 5). Data review results are summarized on RSI Review Summary (page 6).
2) RSI Follow-up static survey—24 locations identified during the data review process were investigated. Eight follow-up locations exceeded the Reference Area static IL for regions of interests (ROIs) 6, 7, and/or 8 (VD1). Follow-up locations are shown on the RSI Follow-up Static Survey map (page 7).
<b>Note:</b> Gamma readings reported in the Instrument and Survey Data table (page 1) for the gamma walkover and follow-up static surveys show the mean gamma gross count rate range(ROI 10,VD1) for all surveyed follow-up locations. Spectral analysis result of follow-up locations 1, 2, 6, 10, 14, 16, 17, and 22 exceeded the Reference Area Static IL for regions of interests (ROI) 6, 7, and/or 8. Count rates in all radionuclide-specific ROIs (3, 6, 7 and 8) were less than the radionuclide-specific Reference Area static ILs for all other follow-up investigation locations.
Biased soil samples PE2-RSYB2-DC-B-S001-PE2-RSYB2-DC-B-S008 were collected and submitted for gamma spectroscopy analysis to further characterize the elevated soil readings at follow-up locations 1, 2, 6, 10, 14, 16, 17 and 22 (see Summary Note 4 below).
3) Eighteen systematic soil samples (001-018) were obtained and submitted for gamma spectroscopy analysis. Sample locations for systematic samples are shown on the Systematic Sample Survey map (page 8). TestAmerica sample results are attached (pages 36-59).  Ten percent of the systematic soil samples (two samples in total, PE2-RSYB2-DC-S001 & PE2-RSYB2-DC-S011) were also analyzed for total strontium. Total Strontium results are also included in the TestAmerica sample results report (pages 36-59).
4) Biased sample survey—samples PE2-RSYB2-DC-B-S001-PE2-RSYB2-DC-B-S008 were obtained and analyzed to support the evaluation of elevated gamma readings collected at follow-up locations 1, 2, 6, 10, 14, 16, 17 and 22. Biased soil sample location are shown on the Biased Sample Survey map (page 9). TestAmerica sample results are attached (pages 60-75).  <b>Note:</b> Static gamma measurements collected at systematic and biased sample locations were obtained with a handheld Ludlum 2221 Scaler/Ratemeter and 3"x3" NaI probe; the results show gamma readings exceeding the instrument-specific Reference Area Static IL at several sample locations. Sample results indicate that this activity is due to the presence of naturally-occurring non-Navy program radionuclides in the excavated soil.
<b>Conclusions:</b>  All locations with elevated Z-scores identified by the RSI gamma walkover survey were determined to be consistent with background. 24 locations were investigated during the follow-up static survey, with eight readings greater than the Reference Area static IL at follow-up locations 1, 2, 6, 10, 14, 16, 17, and 22 for ROIs 6, 7 and/or 8 (VD1). Spectral analysis results and gamma static data for each region of interest (ROI) are provided (pages 10-33).  Final analytical results for systematic and biased samples from this RSY pad are concluded to be comparable to background. Histograms showing systematic soil sample activity concentrations are provided (pages 34-35). Ten percent of the systematic soil samples (two samples in total, PE2-RSYB2-DC-S001 & PE2-RSYB2-DC-S011) were also analyzed for total strontium, with concentrations less than the Project Action Limit of 0.331 pCi/g, as shown in the Soil Sample Data table (page 1).  This data package characterizes the construction base layer for RSY B2 pad. The soil was initially import clean material.  APTIM request RASO concurrence to release this soil as Non-LLRW. Disposition: This soil shall be dispositioned as non-LLRW waste. The soil will be stockpiled onsite for reuse following appropriate chemical characterization.

## RSI Data Evaluation Process

### RS-700 Mobile Radiation Monitoring System

- Self-contained gamma-ray radiation detection and monitoring system
- (2) RSX-1 4-liter NaI(Tl) gamma detectors oriented perpendicular to the direction of travel (VD1 denotes both detectors summed; VD3 refers to the left detector; and VD4 refers to the right detector)
- Multi-Channel Analyzer, allowing for monitoring of energy-specific regions of interest (ROIs)
- RadAssist survey software for control, monitoring, and recording

Ten ROIs have been established for radium and progeny, cesium, and cobalt, as well as other naturally-occurring or anthropogenic gamma-emitting radionuclides that may be of interest:

ROI	Description	Energy Range (keV)	Primary Peak (keV)
1	Total counts	411 – 2811	N/A
2	Potassium	1371 – 1569	1460
3	U/Ra-226	1659 – 1860	1764 (Bi-214)
4	Thorium	2409 – 2811	2614 (Tl-208)
5	Annihilation	456 – 570	511
6	Ra-226	546 – 666	609 (Bi-214)
7	Cs-137	600 - 720	662
8	Pb-214/Ra-226	327 – 399	351
9	Co-60	1085 - 1370	1173/1332
10	Gross Counts	24 – 2811	N/A

A tiered approach is used during data review to identify follow-up locations. Raw data are exported to a comma delimited format using RadAssist and imported into an Excel spreadsheet for review and analysis. The following review steps are completed to determine if additional follow-up measurements are necessary:

- **Playback Review:** The data file is replayed in RadAssist and reviewed for elevated count rates in ROIs 6, 7, 9, and 10 for virtual detector (VD) 1 (both detectors summed). The scan screen is also monitored for elevated count rates and alarms.
- **Count Rate Time Series Review:** The count rates for ROIs 6, 7, 9, and 10 for VDs 1, 3 (detector 1), and 4 (detector 2) are plotted in a time series and reviewed for additional peaks in count rate.
- **All ROIs:**
  - **Z-Scores:** The Z-Scores are calculated for each location in all ROIs for VDs 1, 3, and 4. Any location with four or more ROIs having a Z-Score greater than three ( $Z>3$ ) is marked for follow-up.
  - **Local Z-Scores:** Local Z-Scores are calculated using a moving average for each data point in all ROIs for VDs 1, 3, and 4 to identify elevated count rates where the background is variable (e.g. multiple surface types). Any location (in a survey unit that meets this condition) with four or more ROIs having a local  $Z>3$  is marked for follow-up.
  - **Semi-local Z-Scores:** Semi-local Z-Scores are calculated using the global average, but with a moving average for the standard deviation for VDs 1, 3, and 4. This is used for survey data that have a consistent background but an area or areas of highly elevated count rates, in order to identify smaller areas of elevated count rates that may not otherwise be identified by the initial Z-score review. Any location (in a survey unit that meets this condition) with four or more ROIs having a semi-local  $Z>3$  is marked for follow-up.
- **ROIs 3, 6, 8, and 10 (radium-specific ROIs):**
  - Z-Scores: The Z-Scores are calculated for each location in the radium-specific ROIs for VDs 1, 3, and 4. Any location with three or more radium-specific ROIs having a  $Z>3$  is marked for follow-up.
  - Local Z-Scores: Local Z-Scores are calculated using a moving average for each data point in the radium-specific ROIs for VDs 1, 3, and 4 to identify elevated count rates where the background is variable (e.g. multiple surface types). Any location (in a survey unit that meets this condition) with three or more radium-specific ROIs having a local  $Z>3$  is marked for follow-up.
  - Semi-local Z-Scores: Semi-local Z-Scores are calculated using the global average, but with a moving average for the standard deviation for VDs 1, 3, and 4. This is used for survey data that have a consistent background but an area or areas of highly elevated count rates, in order to identify smaller areas of elevated count rates that may not otherwise

be identified by the initial Z-score review. Any location (in a survey unit that meets this condition) with three or more radium-specific ROIs having a semi-local  $Z > 3$  is marked for follow-up.

- **ROI 7 (cesium-specific ROI):**
  - Z-Scores: Z-Scores are calculated for each location in ROI 7 for VDs 1, 3, and 4. Any location having a  $Z > 3$  is marked for follow-up.
  - Local Z-Scores: Local Z-Scores are calculated using a moving average for each data point in ROI 7 for VDs 1, 3, and 4 to identify elevated count rates where the background is variable (e.g. multiple surface types). Any location (in a survey unit that meets this condition) having a local  $Z > 3$  is marked for follow-up.
  - Semi-local Z-Scores: Semi-local Z-Scores are calculated using the global average, but with a moving average for the standard deviation in ROI 7 for VDs 1, 3, and 4. This is used for survey data that have a consistent background but an area or areas of highly elevated count rates, in order to identify smaller areas of elevated count rates that may not otherwise be identified by the initial Z-score review. Any location (in a survey unit that meets this condition) having a semi-local  $Z > 3$  is marked for follow-up.
- **ROI 9 (cobalt-specific ROI):**
  - Z-Scores: Z-Scores are calculated for each location in ROI 9 for VDs 1, 3, and 4. Any location having a  $Z > 3$  is marked for follow-up.
  - Local Z-Scores: Local Z-Scores are calculated using a moving average for each data point in ROI 9 for VDs 1, 3, and 4 to identify elevated count rates where the background is variable (e.g. multiple surface types). Any location (in a survey unit that meets this condition) having a local  $Z > 3$  is marked for follow-up.
  - Semi-local Z-Scores: Semi-local Z-Scores are calculated using the global average, but with a moving average for the standard deviation in ROI 9 for VDs 1, 3, and 4. This is used for survey data that have a consistent background but an area or areas of highly elevated count rates, in order to identify smaller areas of elevated count rates that may not otherwise be identified by the initial Z-score review. Any location (in a survey unit that meets this condition) having a semi-local  $Z > 3$  is marked for follow-up.
- **Z-Score Time Series Review:** The three types of Z-Scores for ROIs 6, 7, 9, and 10 for VDs 1, 3, and 4 are plotted in a time series and reviewed for additional peaks in Z-Scores.

Any location selected for follow-up or with a Z-Score  $> 3$  in a radium-, cesium-, or cobalt-specific ROI will undergo spectral analysis to determine if it is statistically likely that there are ROC concentrations present at that location in quantities greater than background.

A background spectrum is subtracted from the local spectral data for a given location, and the resulting net spectrum is plotted. Critical levels, as defined in Section 6.7.1 of the Multi Agency Radiation Survey and Site Investigation Manual are calculated and plotted based on background levels. The critical level is the level, in counts, at which there is a statistical probability (with a predetermined confidence) of incorrectly identifying a measurement system background value as greater than background. Any response above this level is considered to be greater than background. The critical level is calculated for ROIs 6, 7, 8, and 9 according to the equation shown below:

Where:

$$L_C = 2.33\sqrt{B}$$

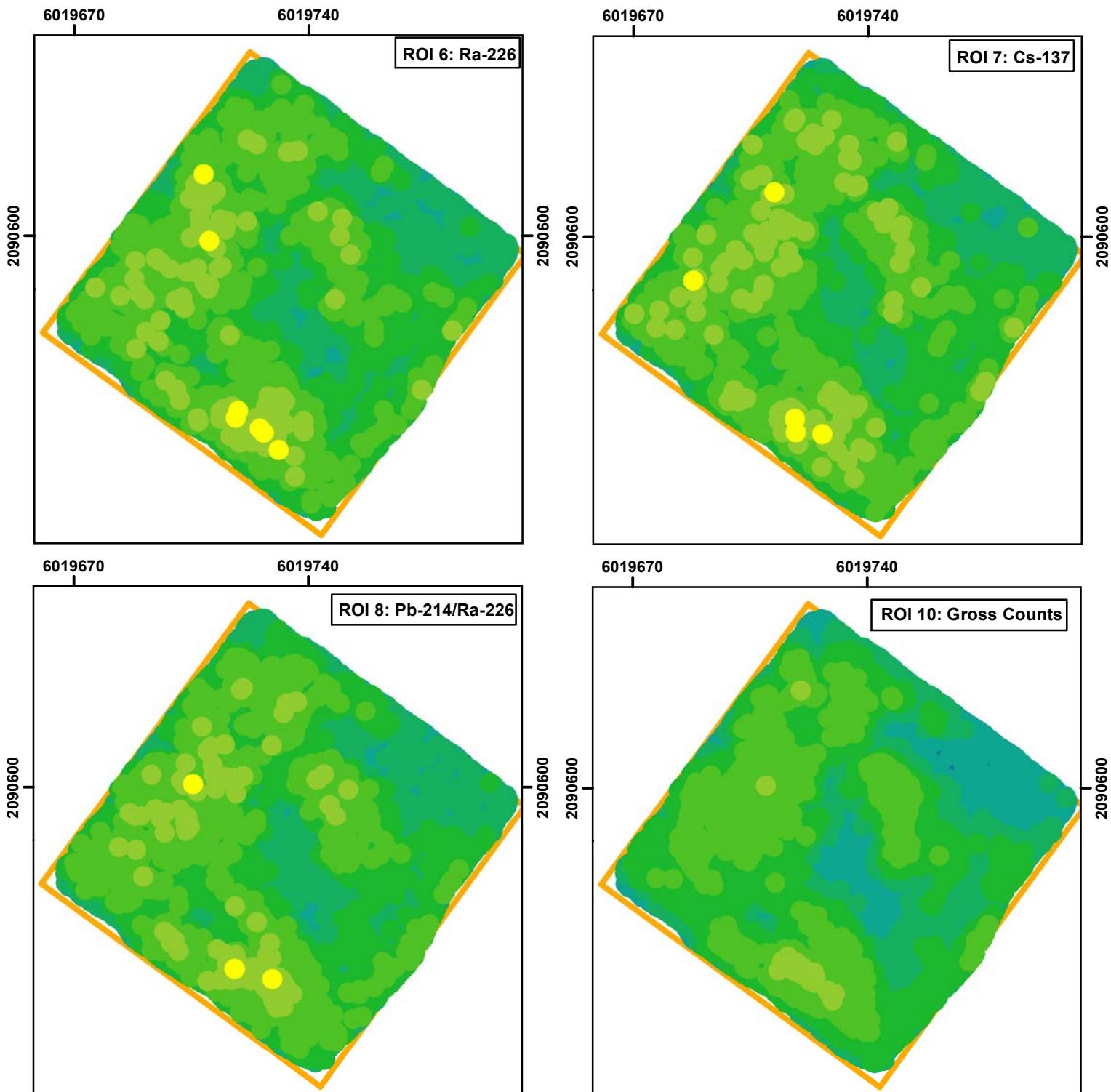
LC	=	critical level (counts)
B	=	average background in the ROI

When count rates in the net gamma spectrum at a given location do not exceed critical levels for any radium-, cesium-, or cobalt-specific energy ranges, it is unlikely that ROC concentrations exist at that location above background.

Any data point that is both above the critical level and within the energy range of a given ROI is considered above background for that radionuclide and will be flagged for further investigation in the field.

# HPNS Parcel E-2 RSY Pad B2 Deconstruction

Contour Maps



## RS 700 Gamma Walkover Survey Data (VD1)

- |                                         |                                        |
|-----------------------------------------|----------------------------------------|
| Yellow dot: > 3 std dev                 | Green circle: > -1 to < 0 std dev      |
| Light green circle: > 2 to < 3 std dev  | Cyan circle: > -2 to < -1 std dev      |
| Medium green circle: > 1 to < 2 std dev | Dark blue circle: > -3 to < -2 std dev |
| Dark green circle: > 0 to < 1 std dev   | Blue circle: < -3 std dev              |
- RSY Pad Boundaries**

0    15    30    60  
Feet

Coordinate system: CSP Zone III. NAD83, US Survey Foot



## RSI Review Summary

### **Summary:**

24 locations were initially selected for follow-up investigation. Locations were identified by elevated peaks noted in the playback review and/or time series charts, and by using the Z-Score, Local Z-Score, and Semi-Local Z-Score reviews as described in the RSI Data Evaluation Process on pages 3-4. Spectral analyses performed on gamma static data at location #1, 2, 6, 10, 14, 16, 17, and 22 exceeded the Reference Area Static IL for region of interest (ROIs) 6,7, and/or 8. All other gamma static readings at follow-up locations were less than the Reference Area static IL for ROIs 3, 6, 7, and 8; figures for all locations are provided on pages 10-33.

RSI Follow-up Static Survey  
HPRS-07302018-PE2-JSS2-2849

## HPNS Parcel E-2 RSY Pad B2-DC

6019670

6019740

6019810

2090700

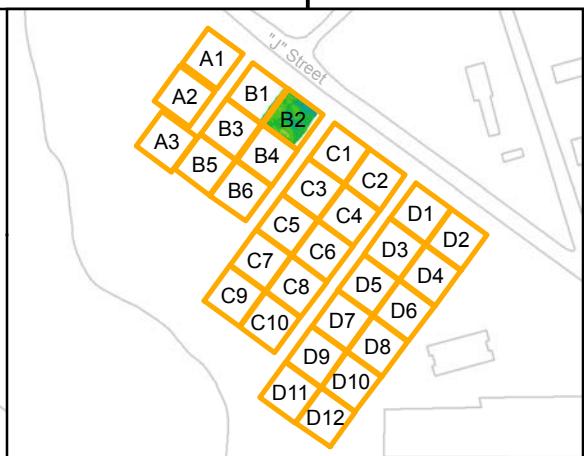
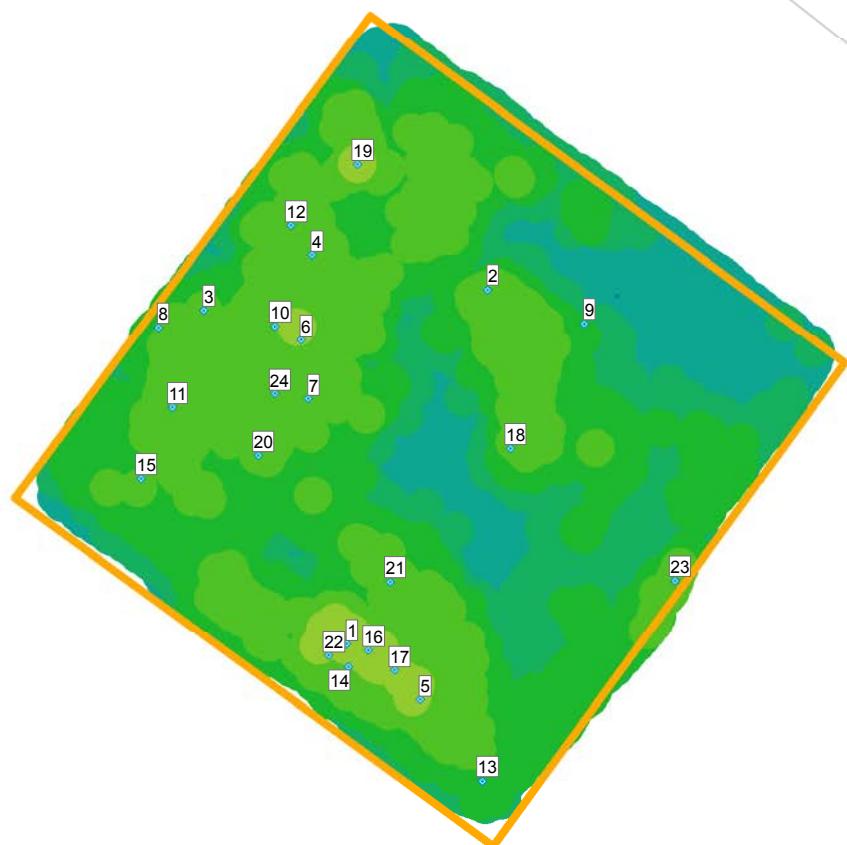
2090700

2090600

2090600

2090500

2090500



### RS 700 Gamma Walkover Survey Data (VD1, ROI 10)

- ◆ Follow-up Locations
- > -1 to < 0 std dev
- > 3 std dev
- > -2 to < -1 std dev
- > 2 to < 3 std dev
- > 1 to < 2 std dev
- > 0 to < 1 std dev
- RSY Pad Boundaries

0 15 30 60 Feet

Coordinate system: CSP Zone III, NAD83, US Survey Foot



Systematic Sample Survey  
HPRS-08012018-PE2-JSS-2870

## HPNS Parcel E-2 RSY Pad B2-DC

6019670

6019740

6019810

2090700

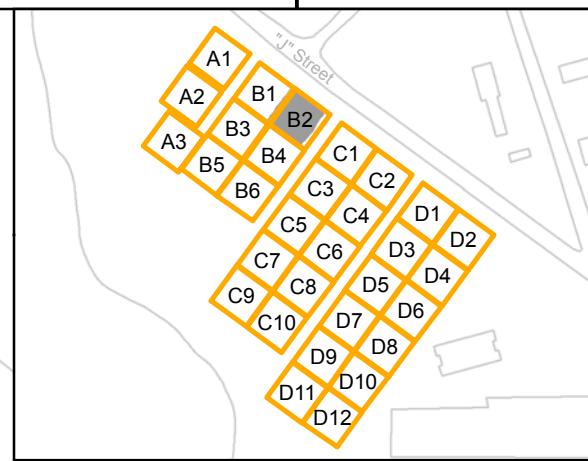
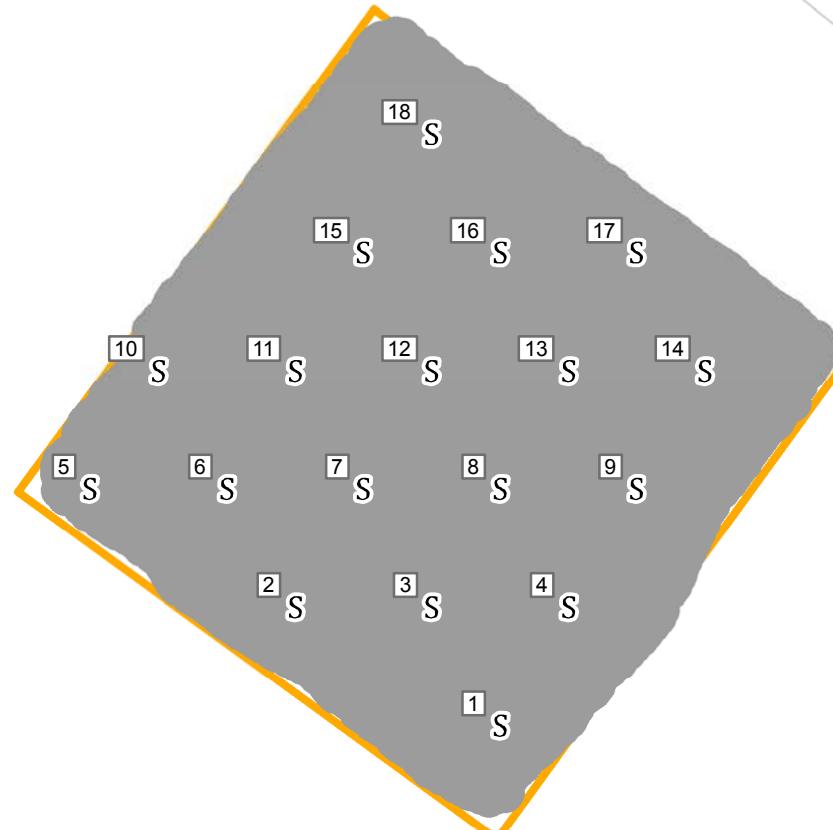
2090700

2090600

2090600

2090500

2090500



**Survey Instrument: Model 2221/ 44-20**  
**Serial Number: 117634**

S Systematic Sample Locations

RS-700 GWS Scan Coverage

RSY Pad Boundaries

0 15 30 60 Feet

Coordinate system: CSP Zone III, NAD83, US Survey Foot



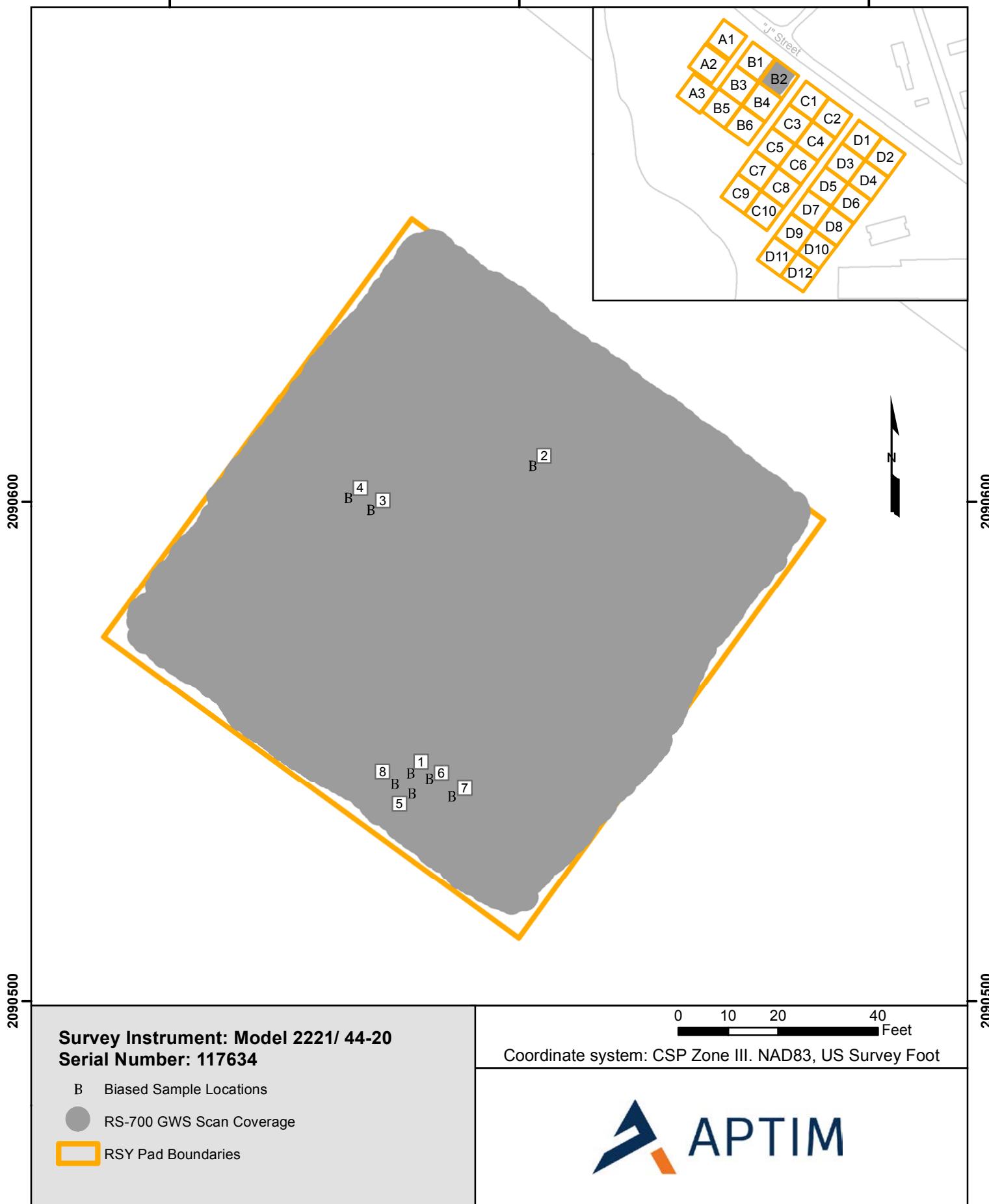
**HPNS Parcel E-2  
RSY Pad B2-DC**

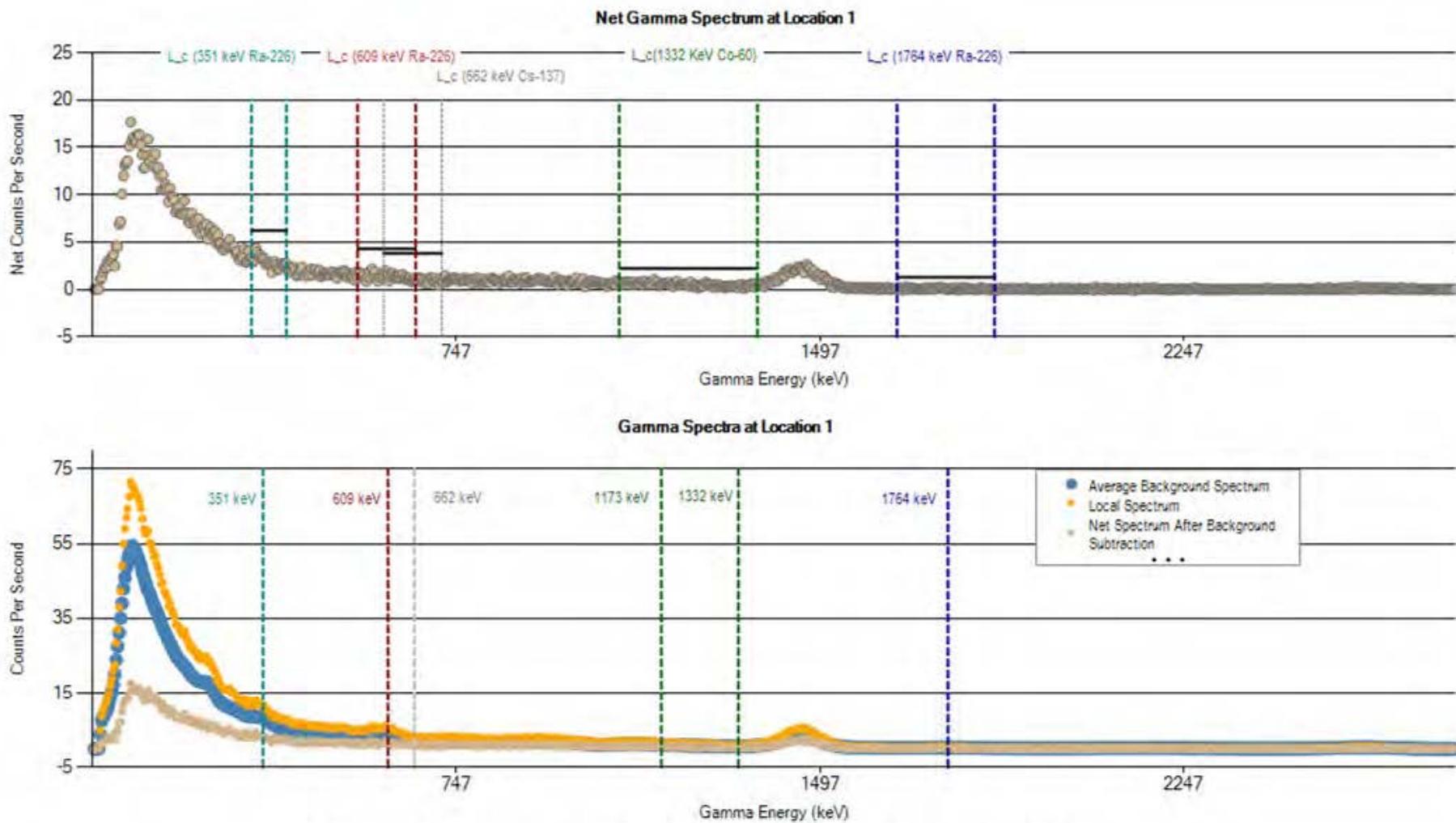
Biased Sample Survey  
HPRS-08022018-PE2-JSS-2878

6019670

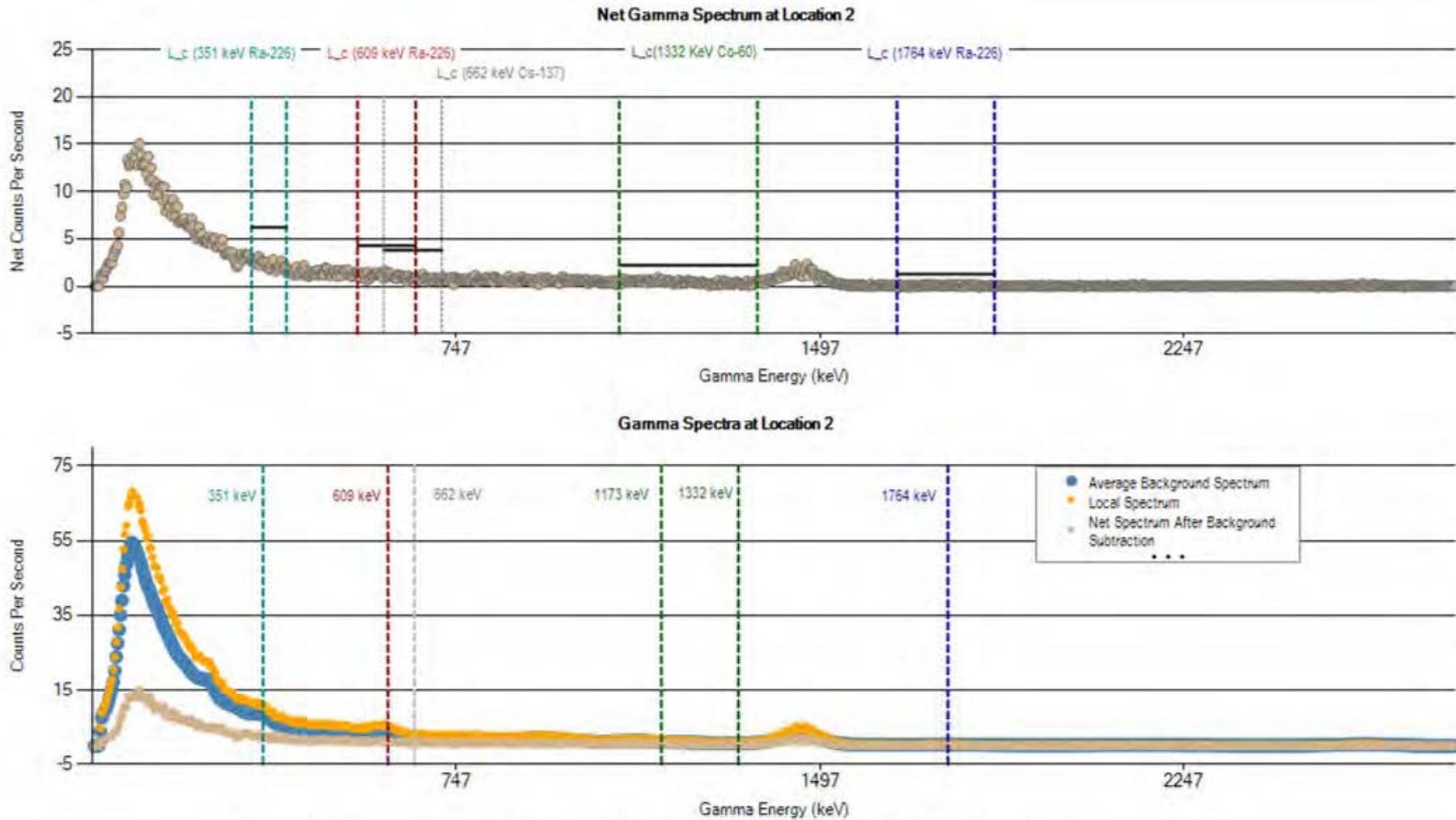
6019740

6019810

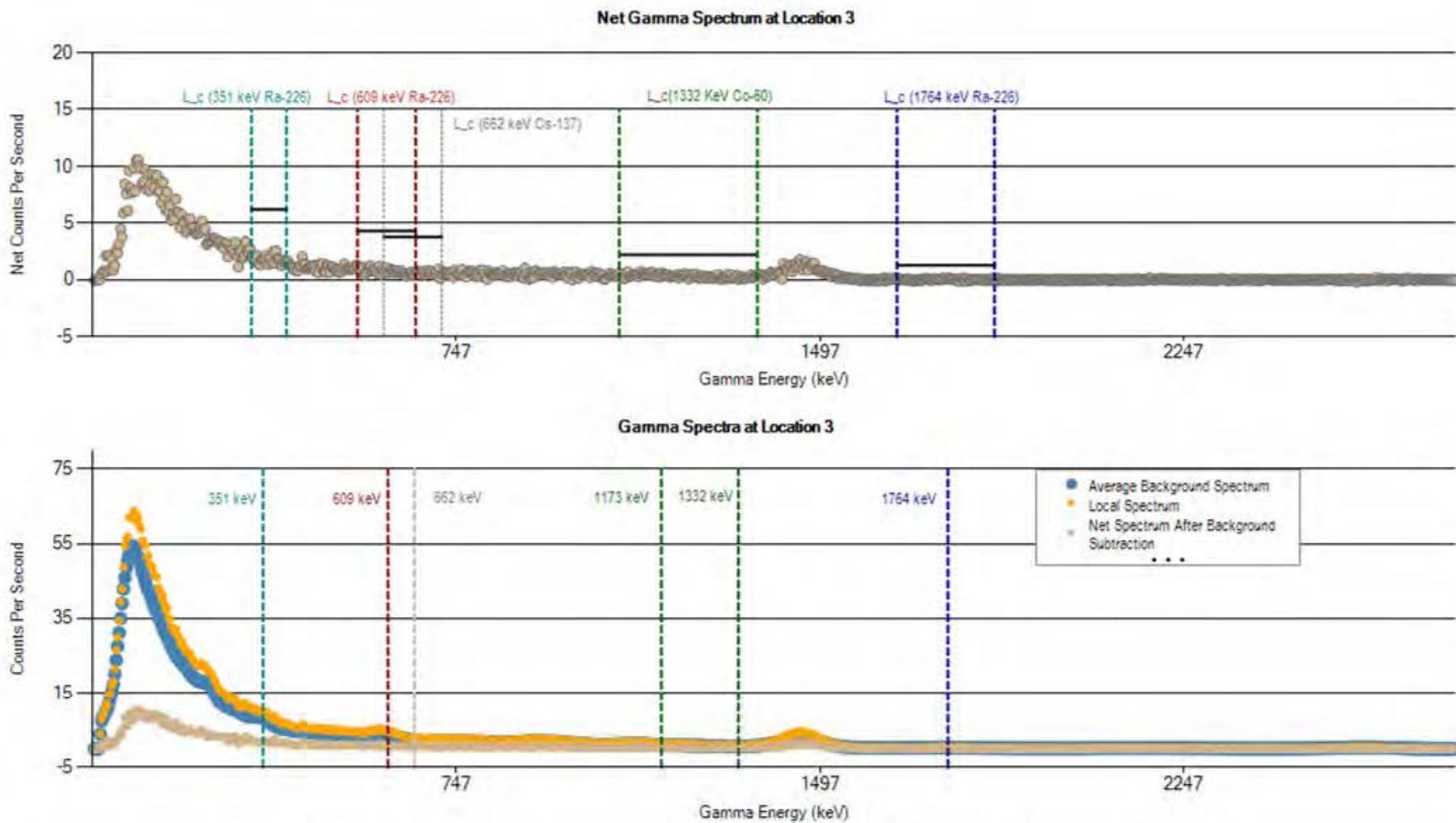




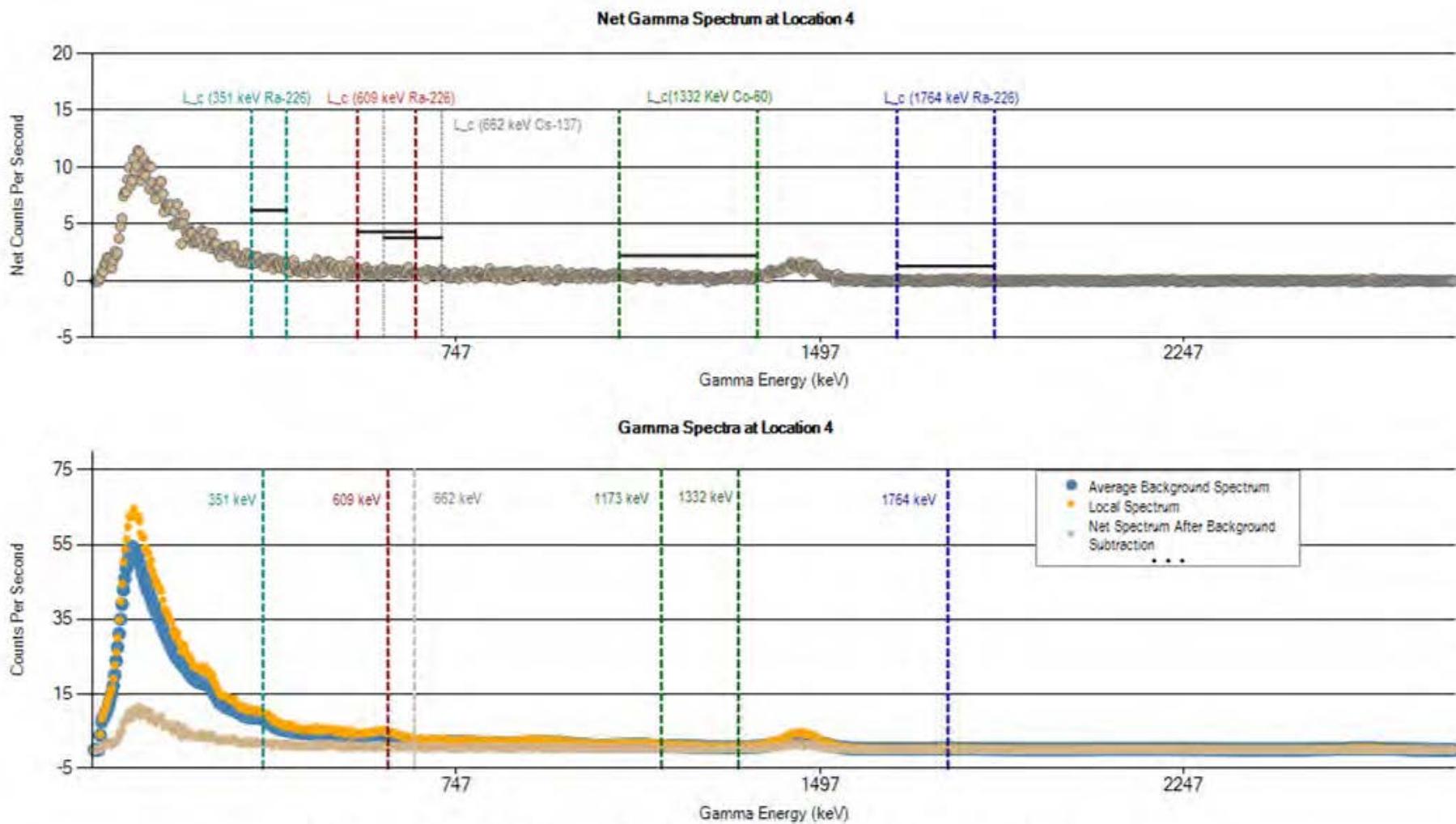
	ROI 1	ROI 2	ROI 3	ROI 4	ROI 5	ROI 6	ROI 7	ROI 8	ROI 9	ROI 10
Location 1 (cps)	1256	193	25	31	213	196	153	247	137	4926
Static IL (cps)	1052	150	35	41	201	189	146	229	120	4255



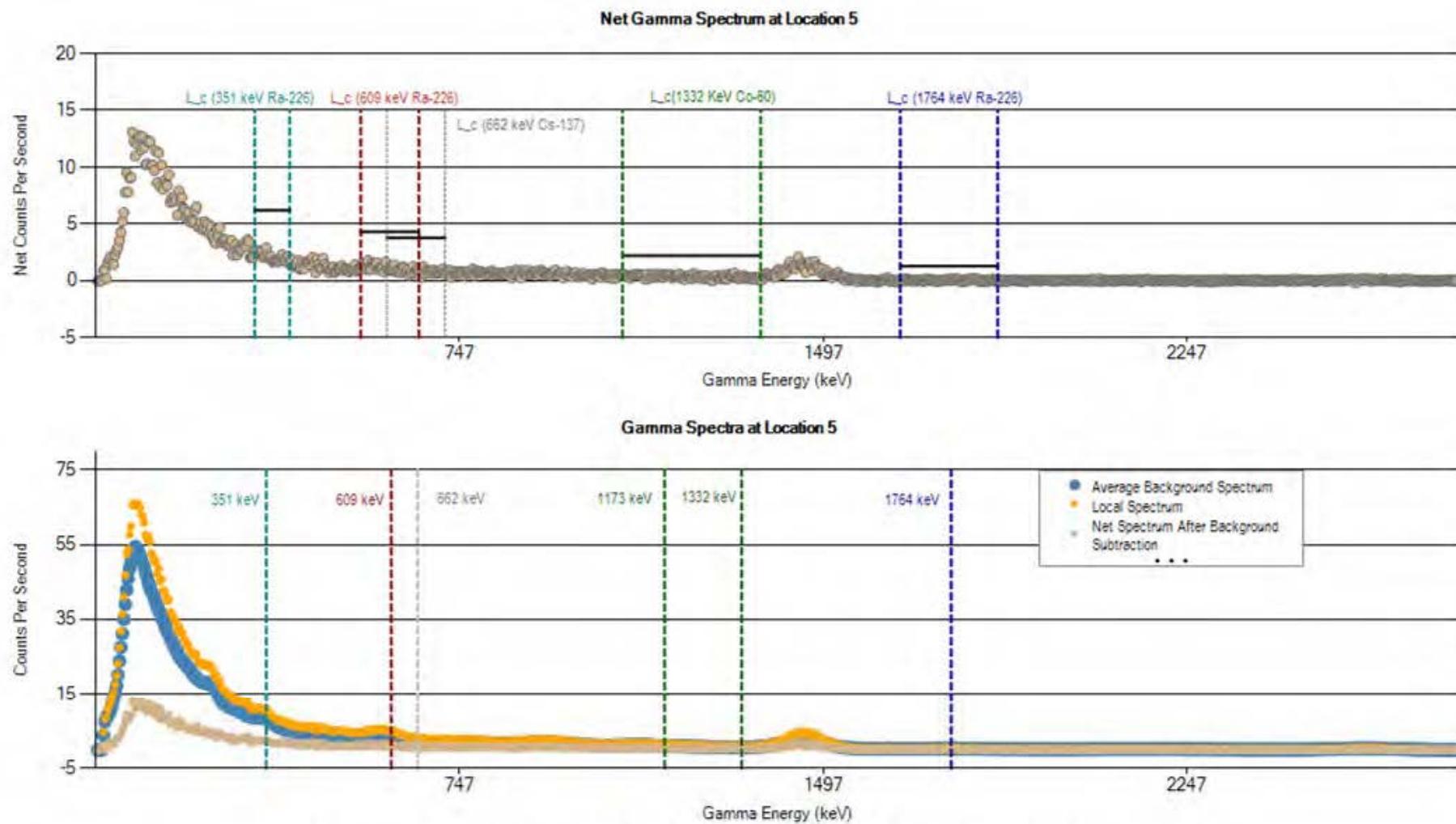
	ROI1	ROI2	ROI3	ROI4	ROI5	ROI6	ROI7	ROI8	ROI9	ROI10
Location 2 (cps)	1168	175	24	28	204	185	145	231	129	4692
Static IL (cps)	1052	150	35	41	201	189	146	229	120	4255



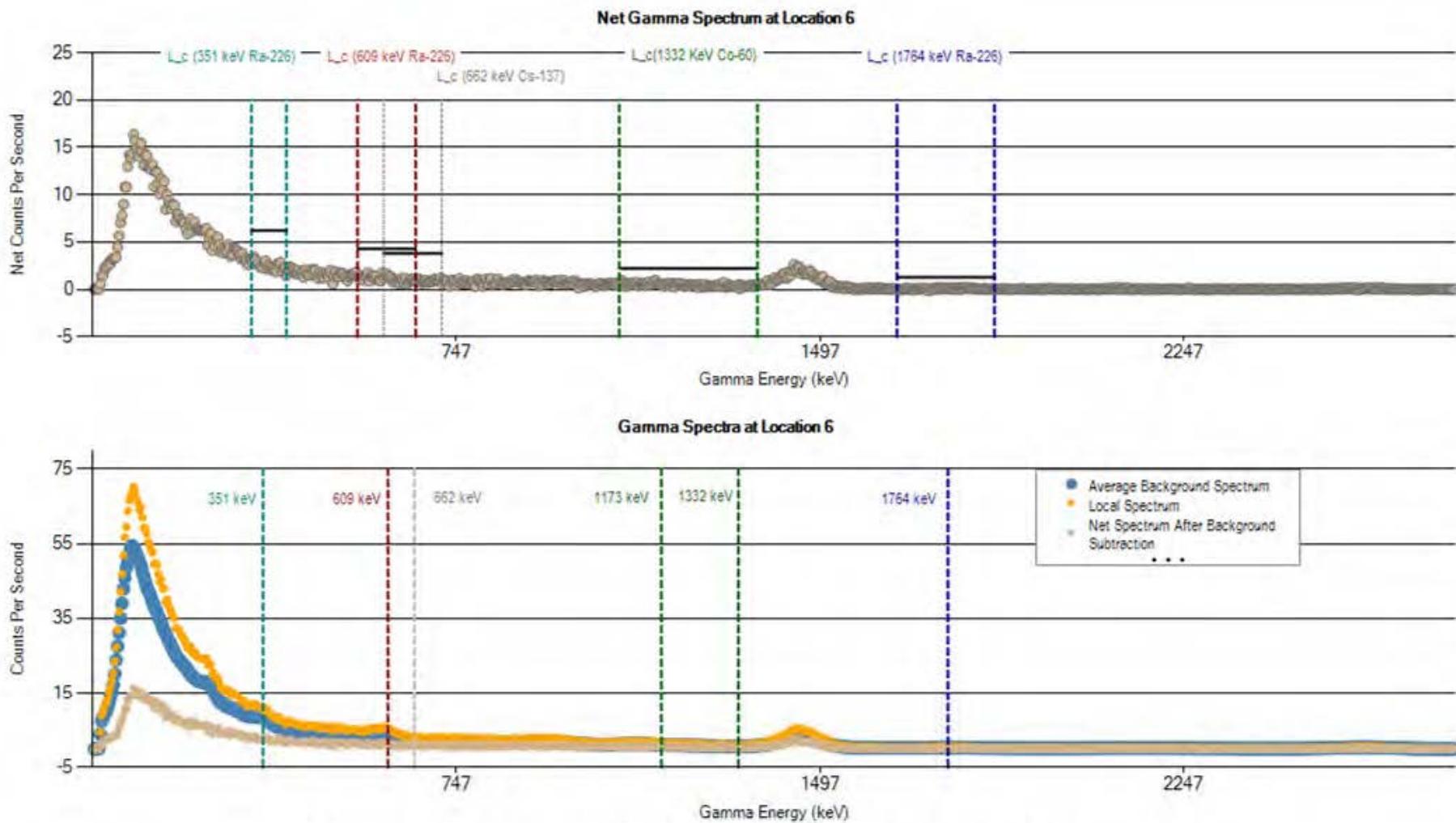
	ROI1	ROI2	ROI3	ROI4	ROI5	ROI6	ROI7	ROI8	ROI9	ROI10
Location 3 (cps)	1089	161	23	26	190	170	133	218	120	4403
Static IL (cps)	1052	150	35	41	201	189	146	229	120	4255



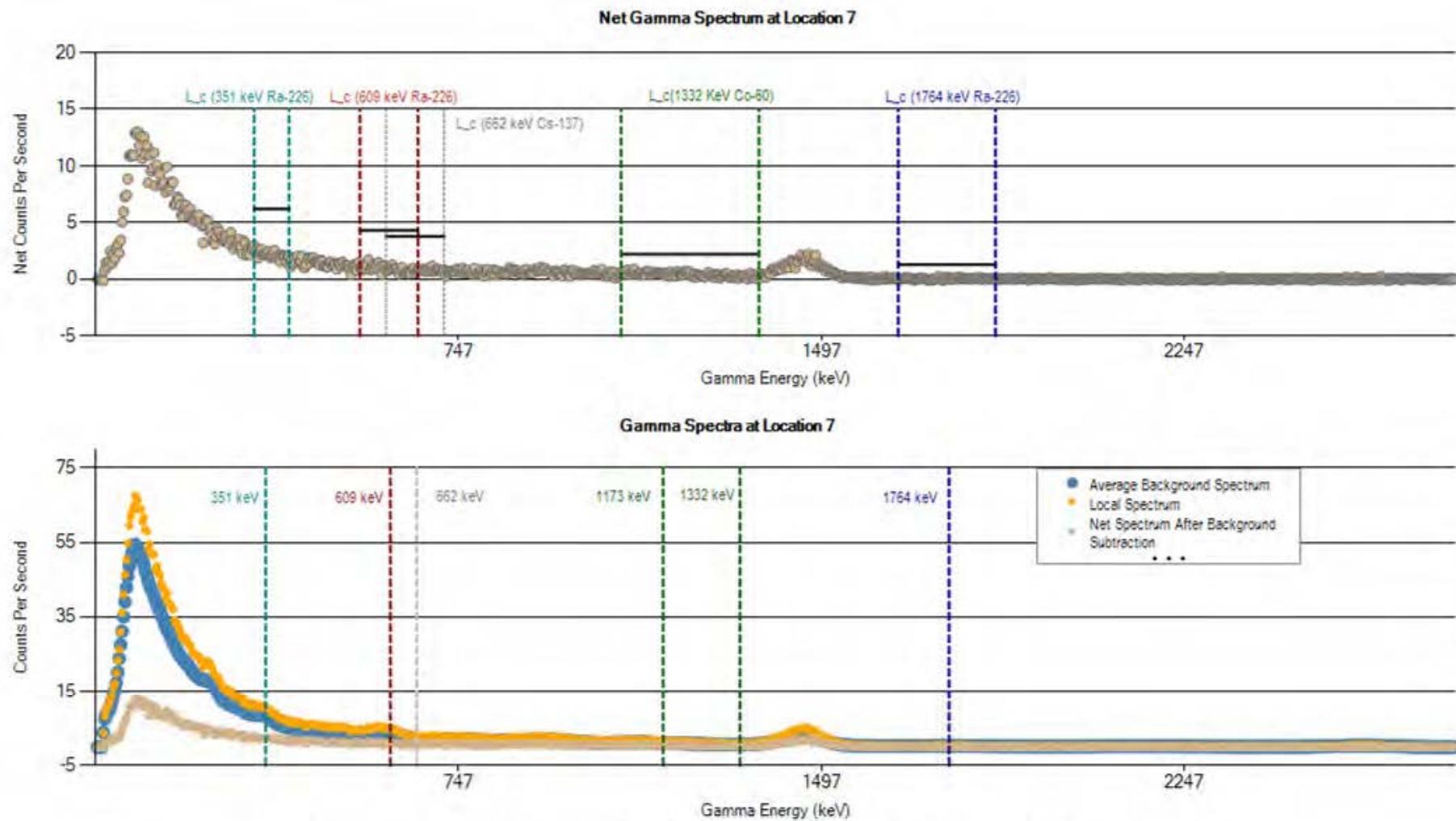
	ROI1	ROI2	ROI3	ROI4	ROI5	ROI6	ROI7	ROI8	ROI9	ROI10
Location 4 (cps)	1092	163	22	25	192	172	136	215	121	4403
Static IL (cps)	1052	150	35	41	201	189	146	229	120	4255



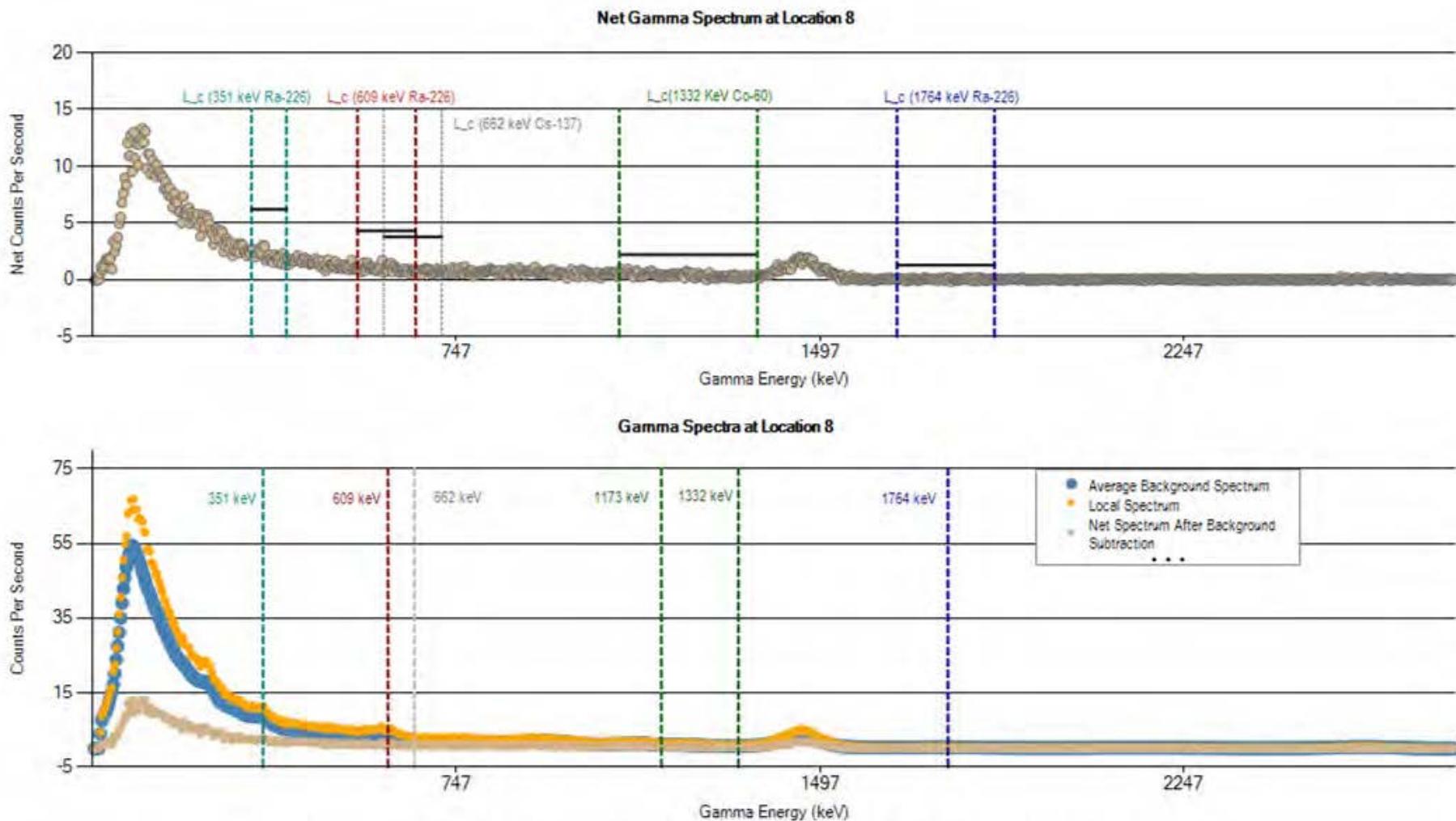
	ROI 1	ROI 2	ROI 3	ROI 4	ROI 5	ROI 6	ROI 7	ROI 8	ROI 9	ROI 10
Location 5 (cps)	1142	166	24	29	196	184	142	226	123	4575
Static IL (cps)	1052	150	35	41	201	189	146	229	120	4255



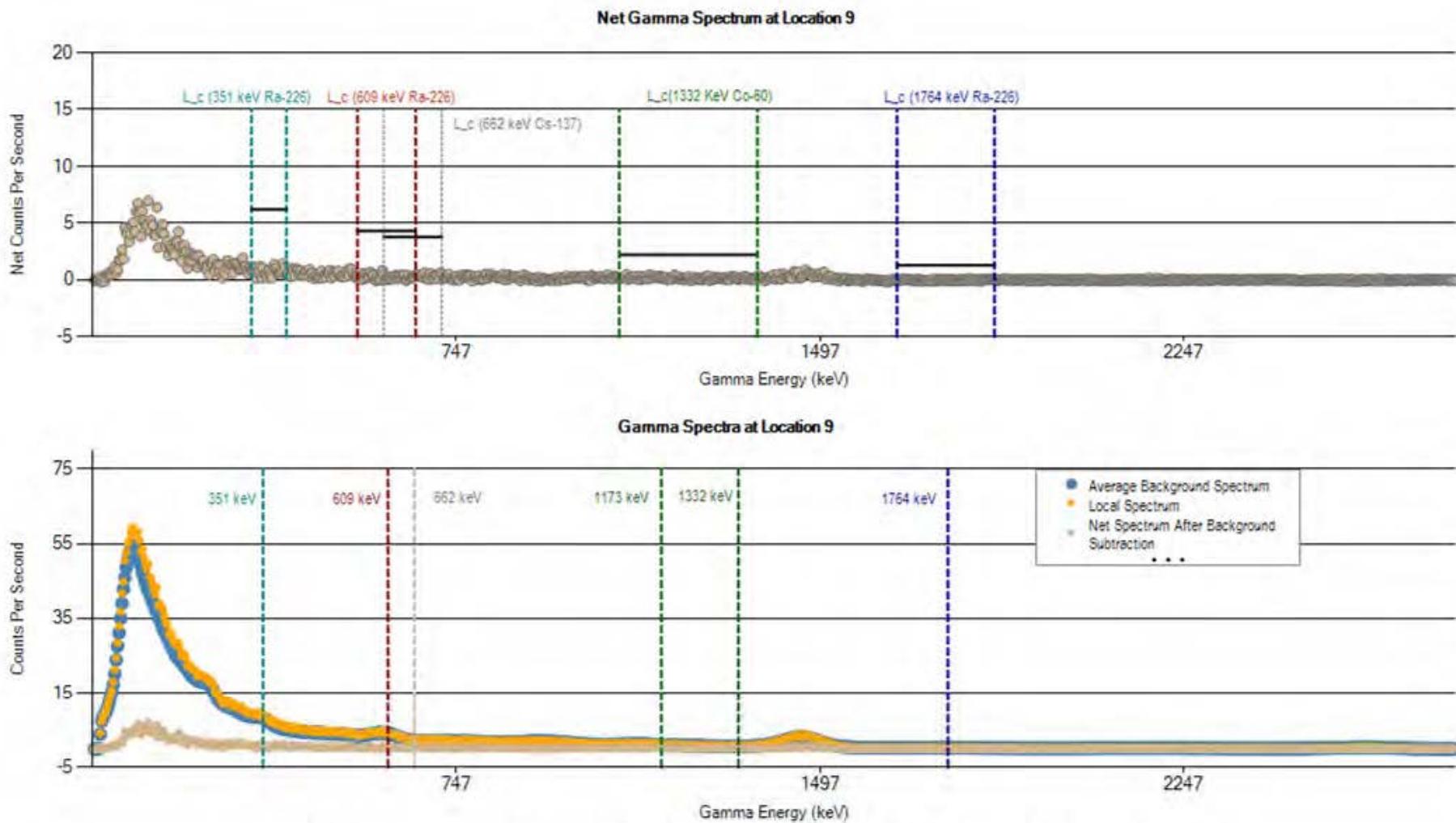
	ROI 1	ROI 2	ROI 3	ROI 4	ROI 5	ROI 6	ROI 7	ROI 8	ROI 9	ROI 10
Location 6 (cps)	1202	184	25	29	208	186	147	236	133	4791
Static IL (cps)	1052	150	35	41	201	189	146	229	120	4255



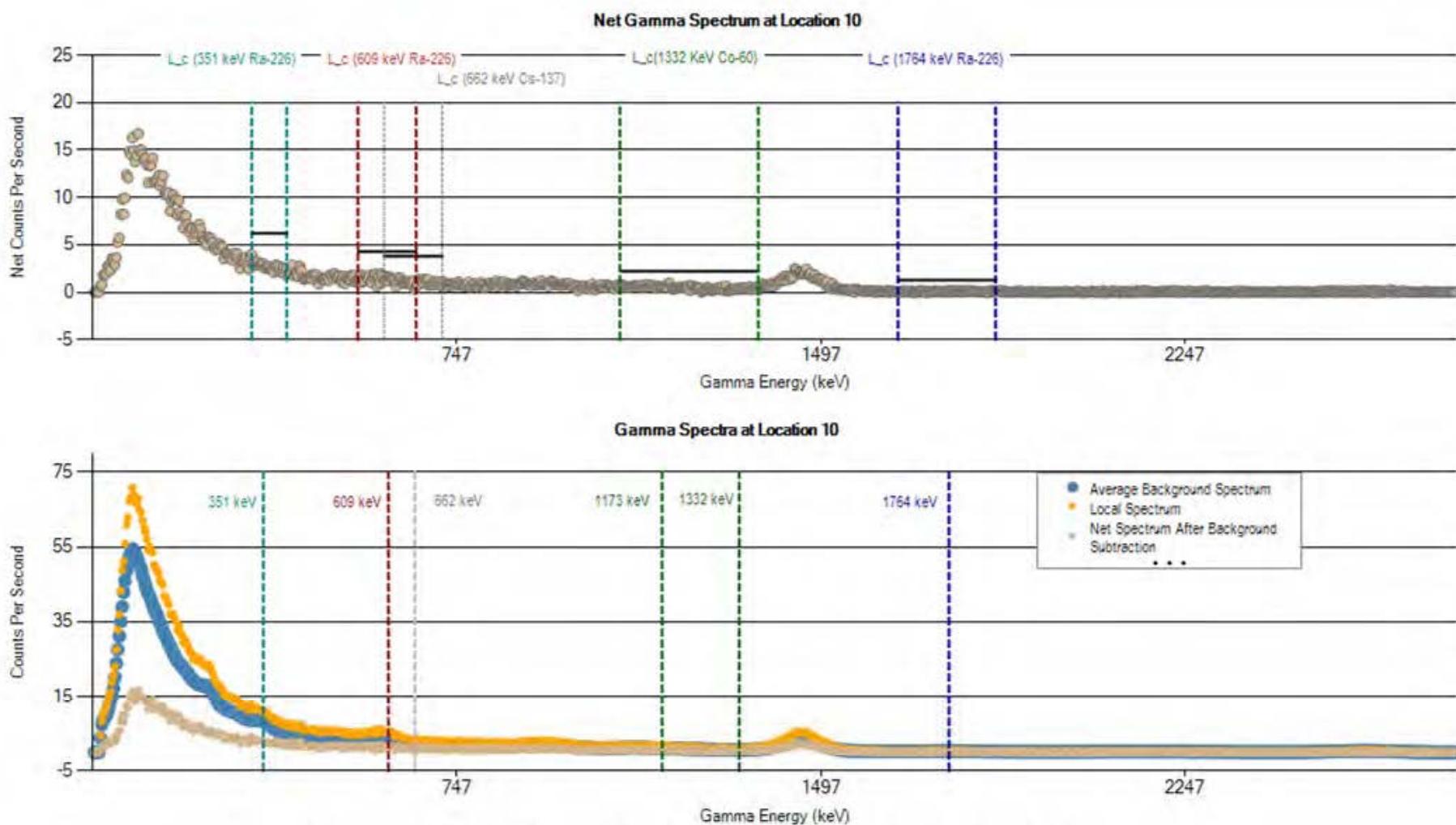
	ROI1	ROI2	ROI3	ROI4	ROI5	ROI6	ROI7	ROI8	ROI9	ROI10
Location 7 (cps)	1152	177	24	27	198	177	139	227	128	4582
Static IL (cps)	1052	150	35	41	201	189	146	229	120	4255



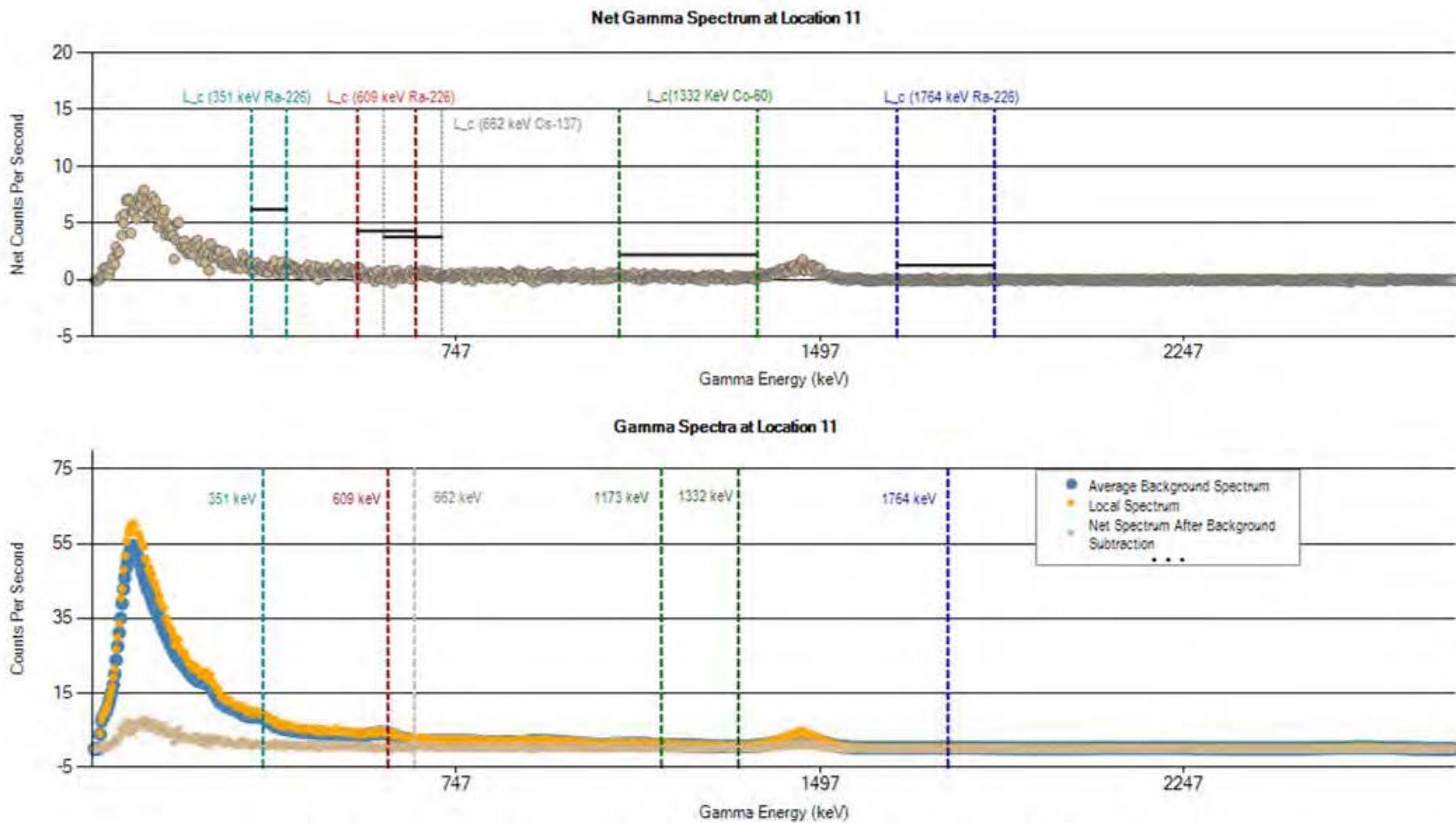
	ROI1	ROI2	ROI3	ROI4	ROI5	ROI6	ROI7	ROI8	ROI9	ROI10
Location 8 (cps)	1162	174	24	28	200	181	142	227	127	4599
Static IL (cps)	1052	150	35	41	201	189	146	229	120	4255



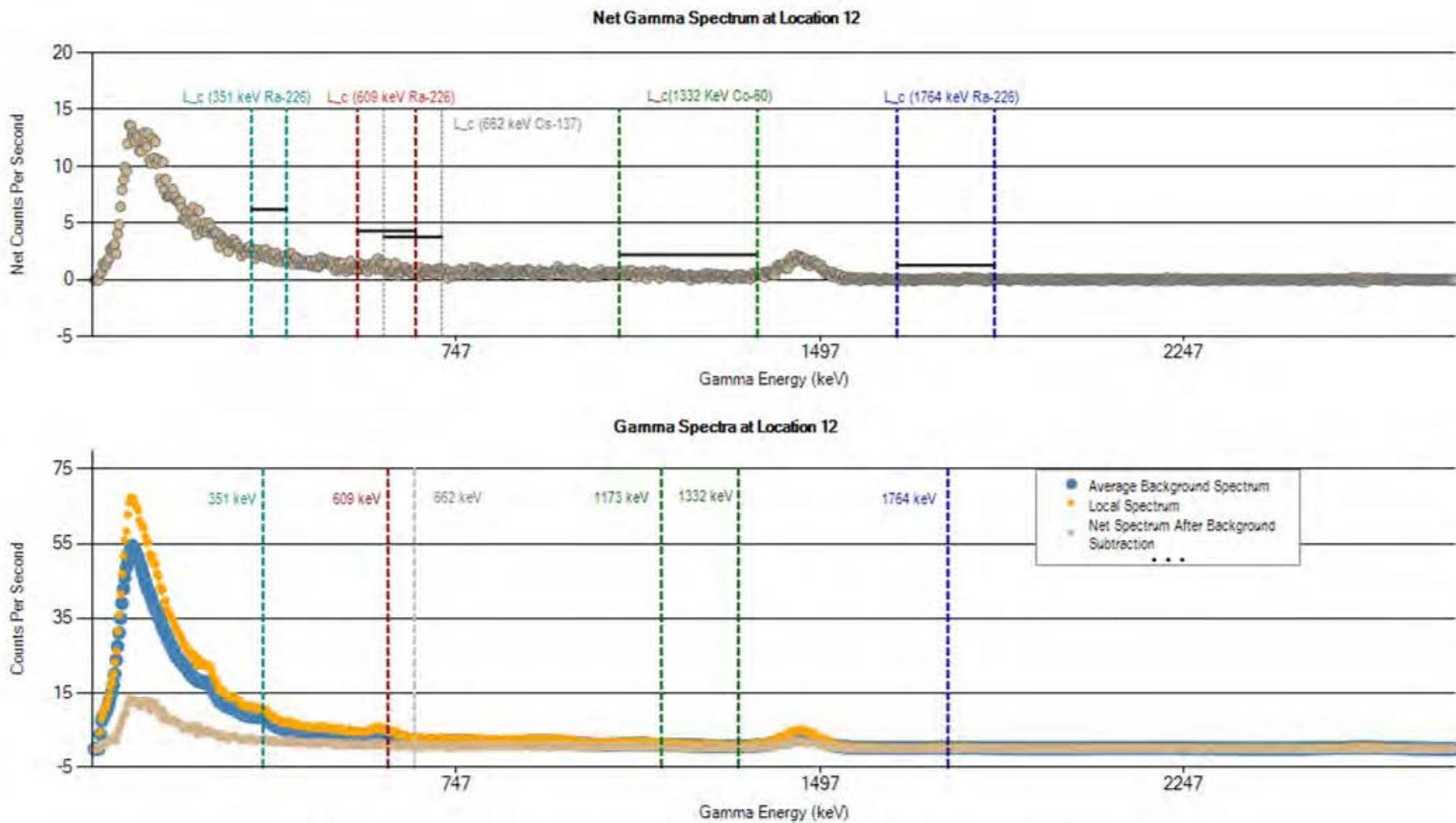
	ROI1	ROI2	ROI3	ROI4	ROI5	ROI6	ROI7	ROI8	ROI9	ROI10
Location 9 (cps)	948	132	20	22	169	151	119	193	105	3973
Static IL (cps)	1052	150	35	41	201	189	146	229	120	4255



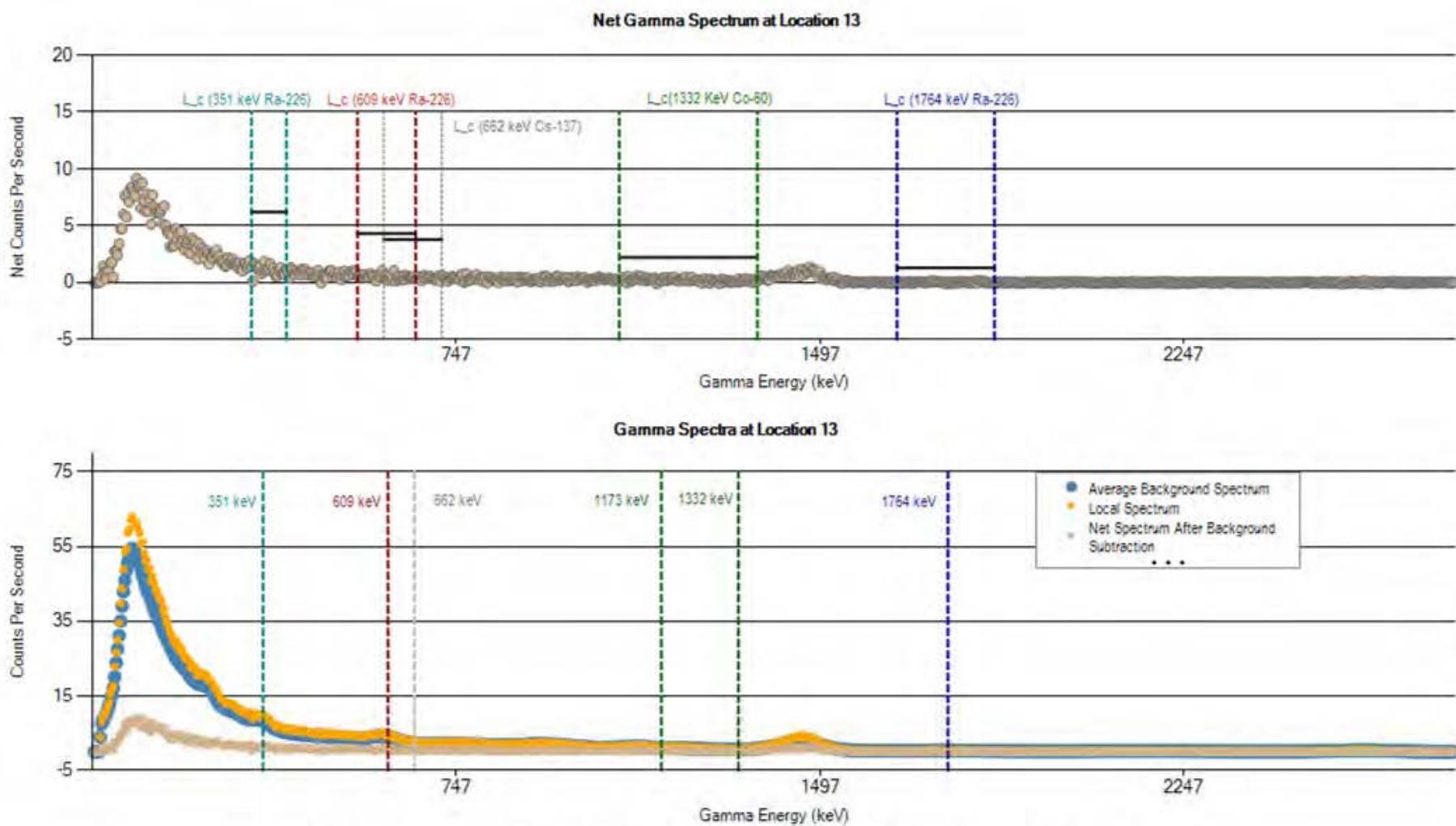
	ROI 1	ROI 2	ROI 3	ROI 4	ROI 5	ROI 6	ROI 7	ROI 8	ROI 9	ROI 10
Location 10 (cps)	1227	187	26	30	209	193	152	240	134	4841
Static IL (cps)	1052	150	35	41	201	189	146	229	120	4255



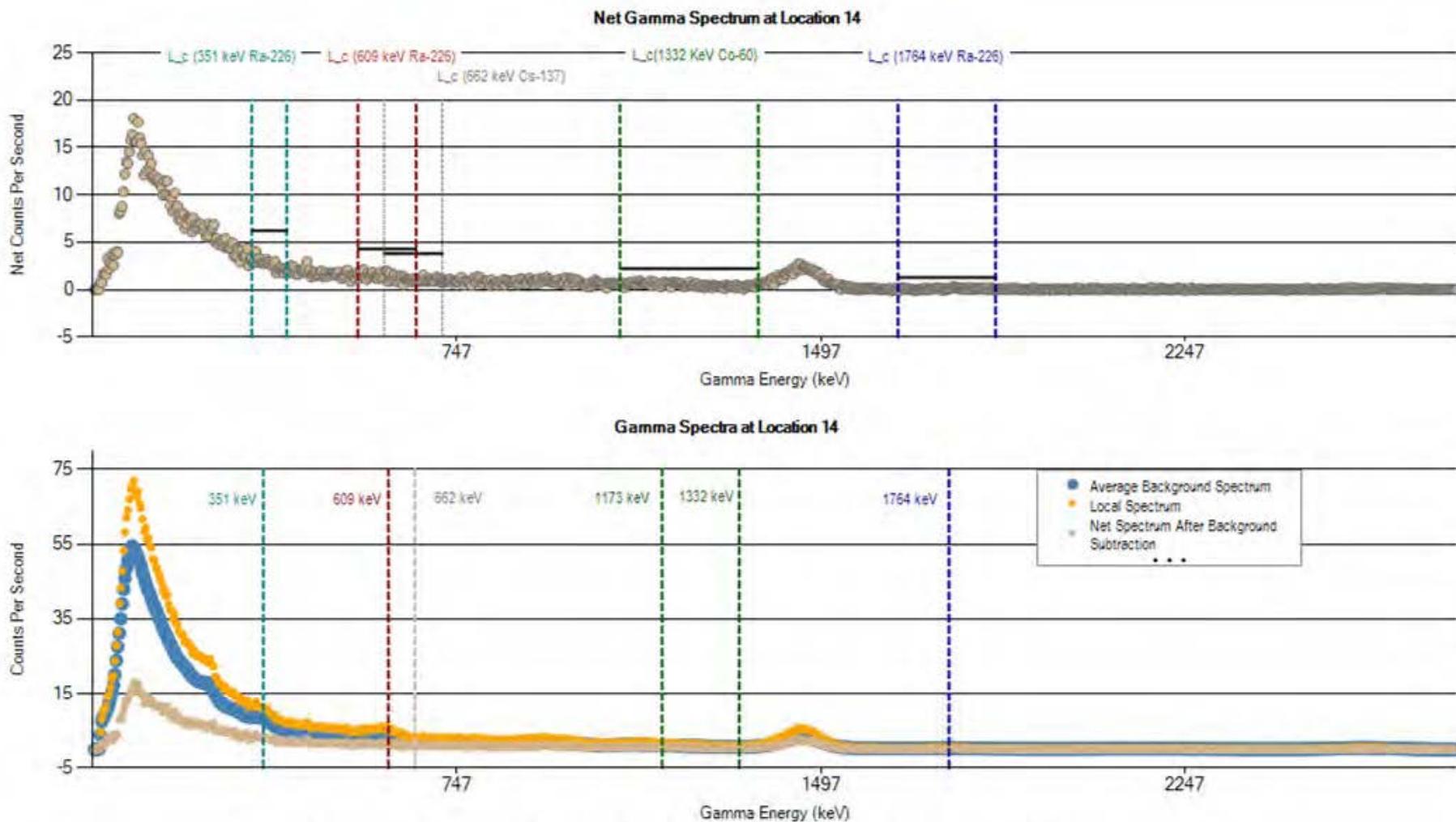
	ROI1	ROI2	ROI3	ROI4	ROI5	ROI6	ROI7	ROI8	ROI9	ROI10
Location 11 (cps)	1024	<b>156</b>	20	24	178	158	126	199	112	4161
Static IL (cps)	1052	150	35	41	201	189	146	229	120	4255



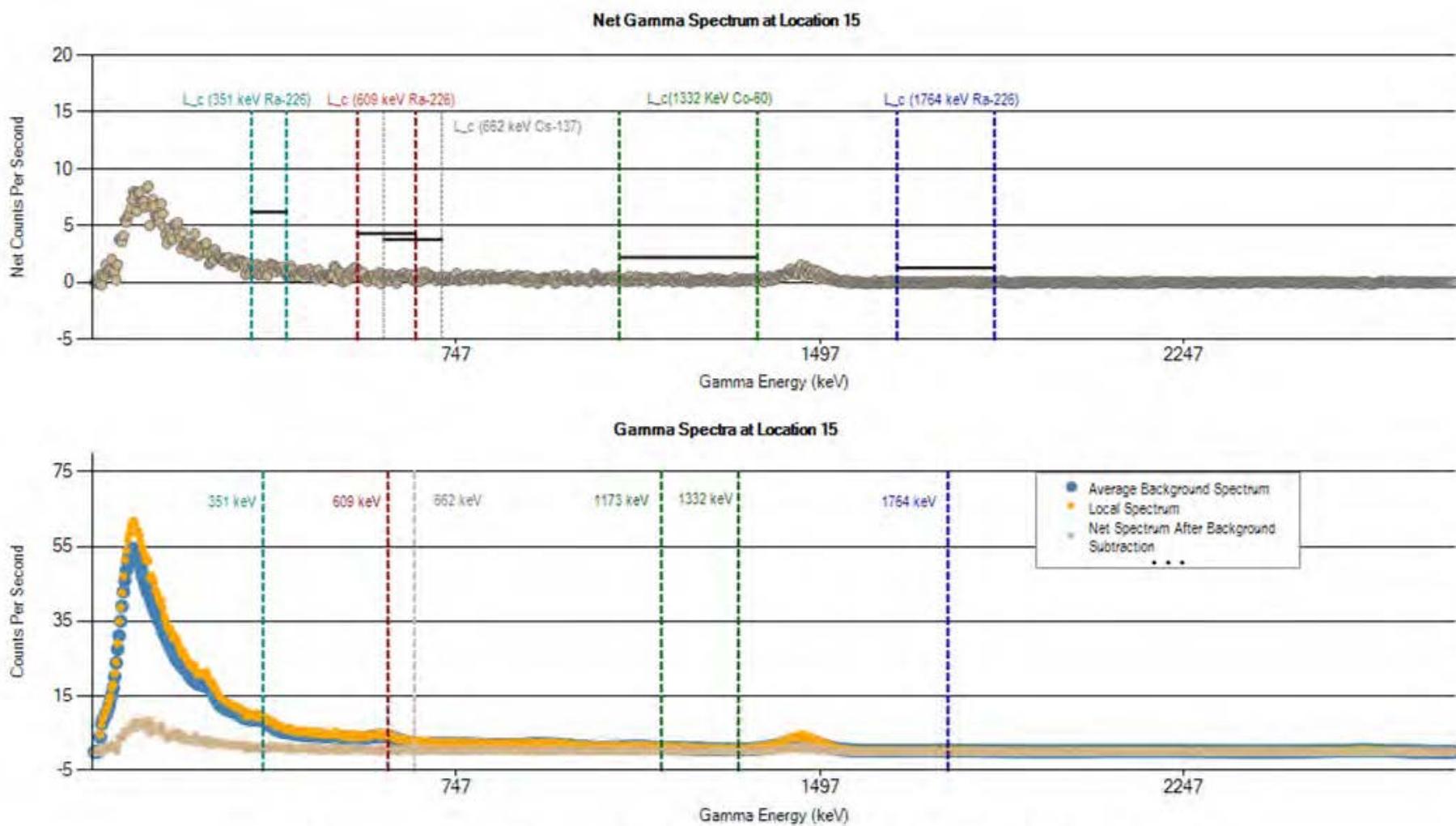
	ROI1	ROI2	ROI3	ROI4	ROI5	ROI6	ROI7	ROI8	ROI9	ROI10
Location 12 (cps)	1165	178	24	27	201	182	140	227	127	4631
Static IL (cps)	1052	150	35	41	201	189	146	229	120	4255



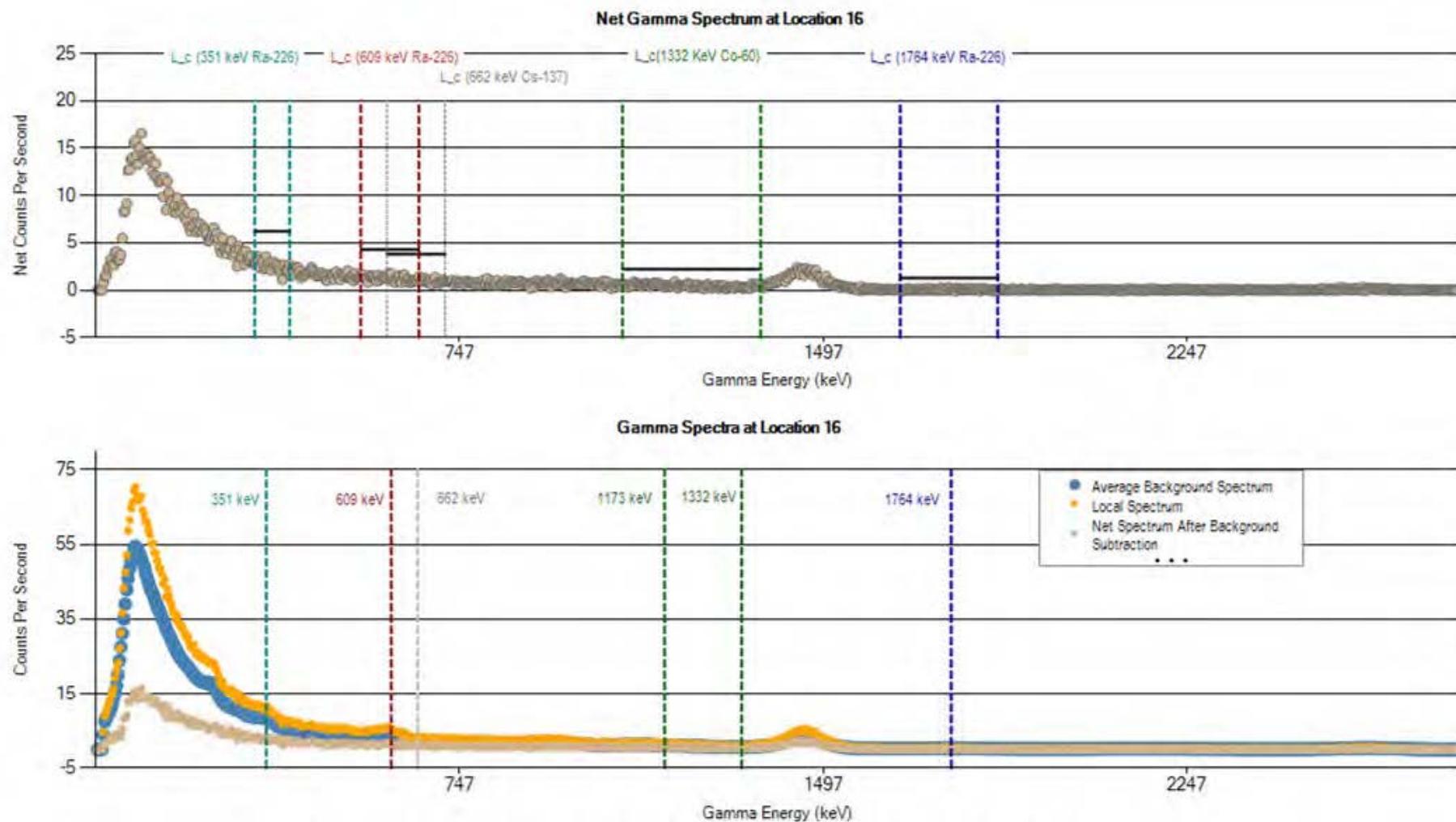
	ROI1	ROI2	ROI3	ROI4	ROI5	ROI6	ROI7	ROI8	ROI9	ROI10
Location 13 (cps)	1014	150	22	25	177	160	125	202	110	4193
Static IL (cps)	1052	150	35	41	201	189	146	229	120	4255



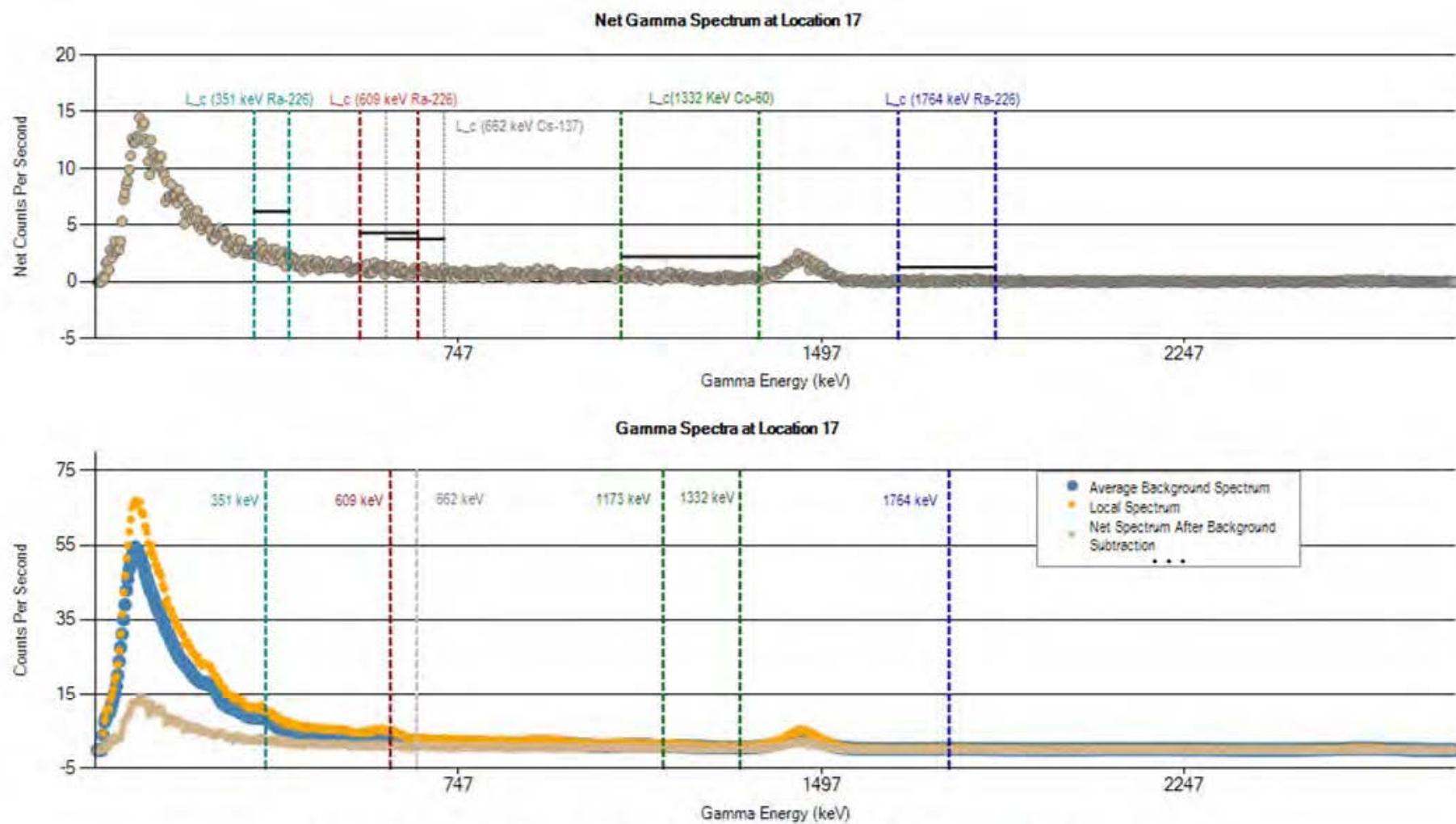
	ROI1	ROI2	ROI3	ROI4	ROI5	ROI6	ROI7	ROI8	ROI9	ROI10
Location 14 (cps)	1248	194	26	30	213	194	152	241	136	4889
Static IL (cps)	1052	150	35	41	201	189	146	229	120	4255



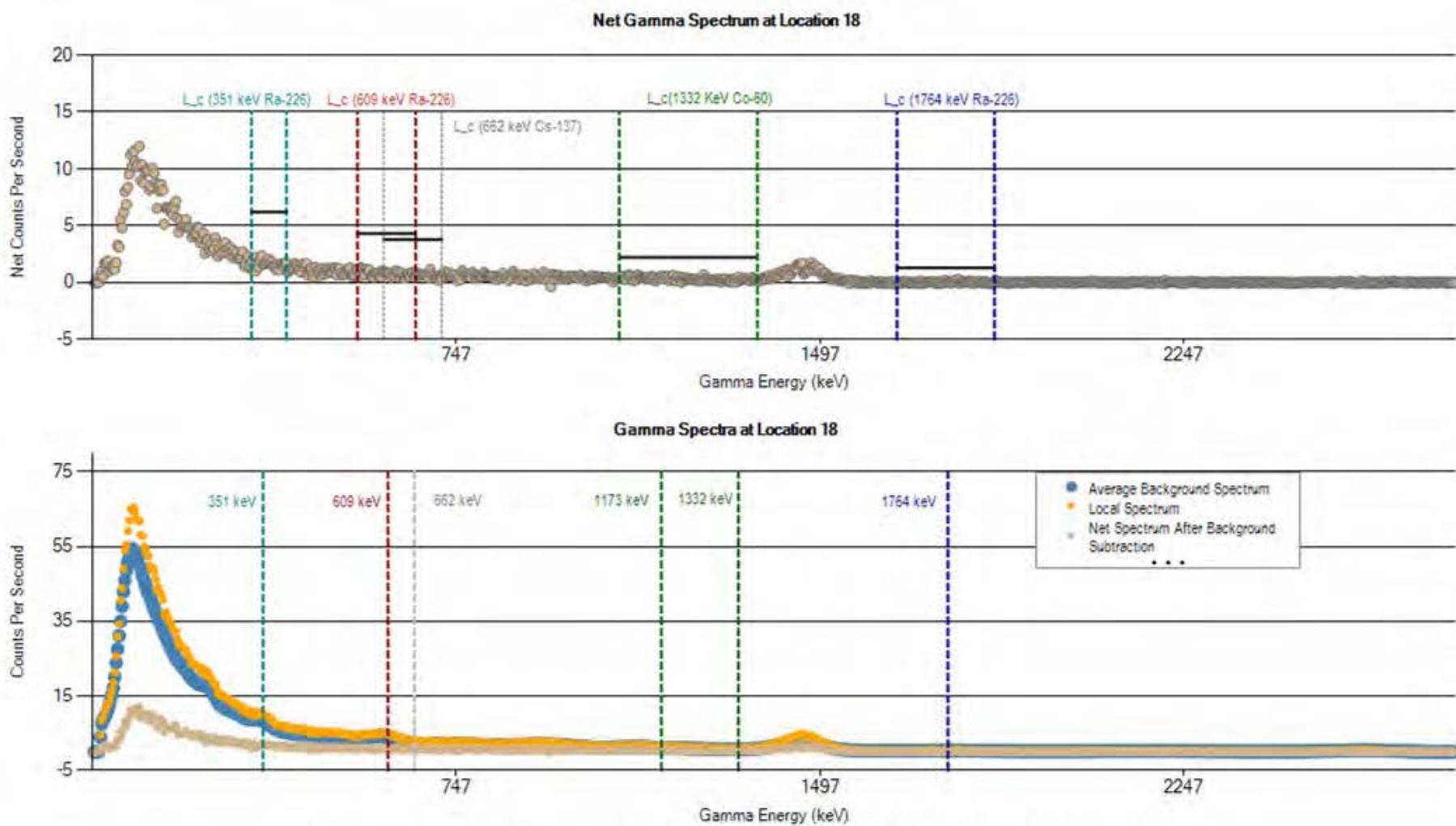
	ROI1	ROI2	ROI3	ROI4	ROI5	ROI6	ROI7	ROI8	ROI9	ROI10
Location 15 (cps)	1015	150	21	25	176	160	126	203	111	4179
Static IL (cps)	1052	150	35	41	201	189	146	229	120	4255



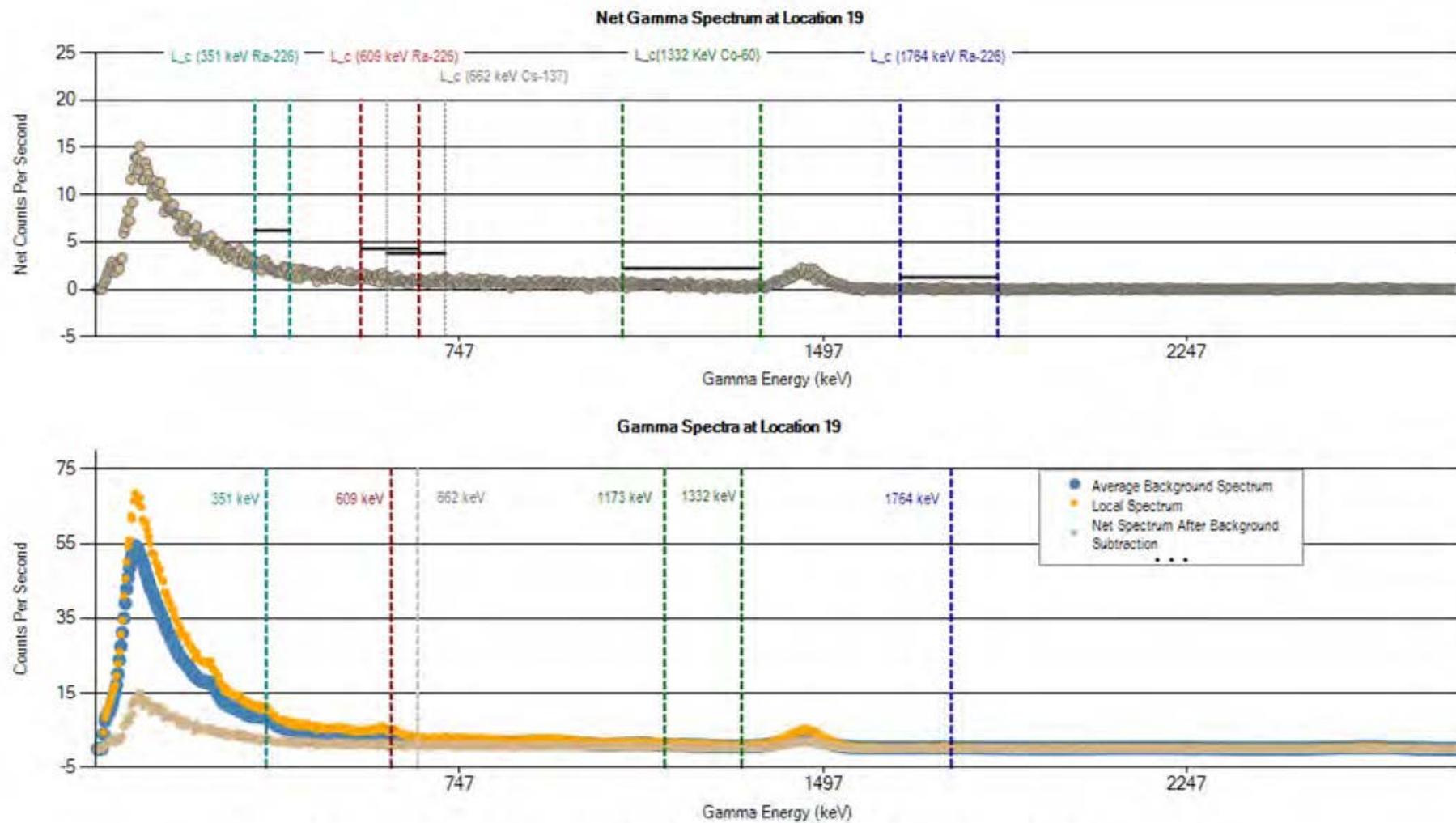
	ROI 1	ROI 2	ROI 3	ROI 4	ROI 5	ROI 6	ROI 7	ROI 8	ROI 9	ROI 10
Location 16 (cps)	<b>1215</b>	<b>186</b>	24	30	<b>208</b>	<b>191</b>	<b>151</b>	<b>238</b>	<b>132</b>	<b>4824</b>
Static IL (cps)	1052	150	35	41	201	189	146	229	120	4255



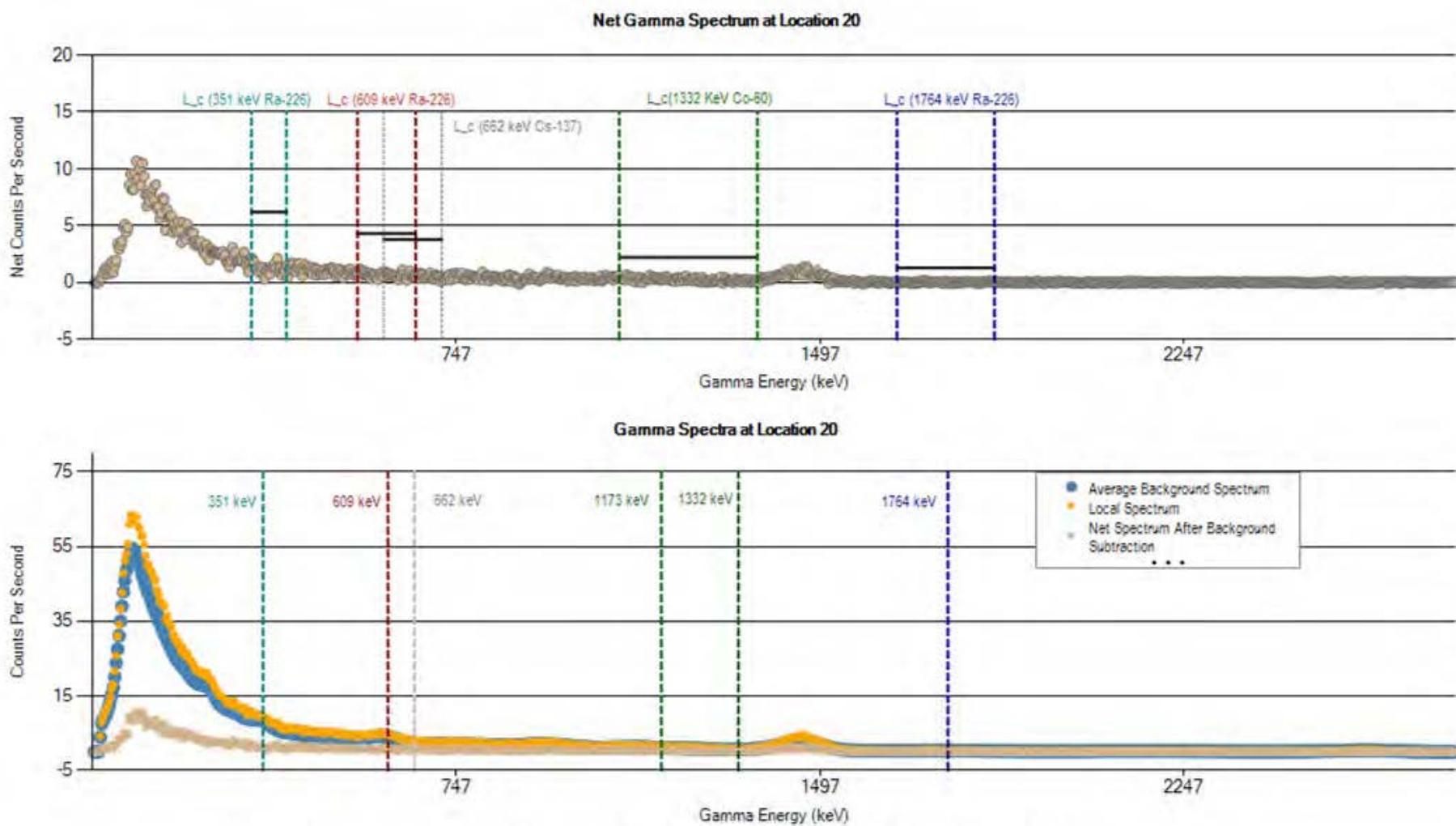
	ROI 1	ROI 2	ROI 3	ROI 4	ROI 5	ROI 6	ROI 7	ROI 8	ROI 9	ROI 10
Location 17 (cps)	<b>1175</b>	<b>180</b>	25	28	<b>202</b>	183	145	<b>235</b>	<b>129</b>	<b>4658</b>
Static IL (cps)	1052	150	35	41	201	189	146	229	120	4255



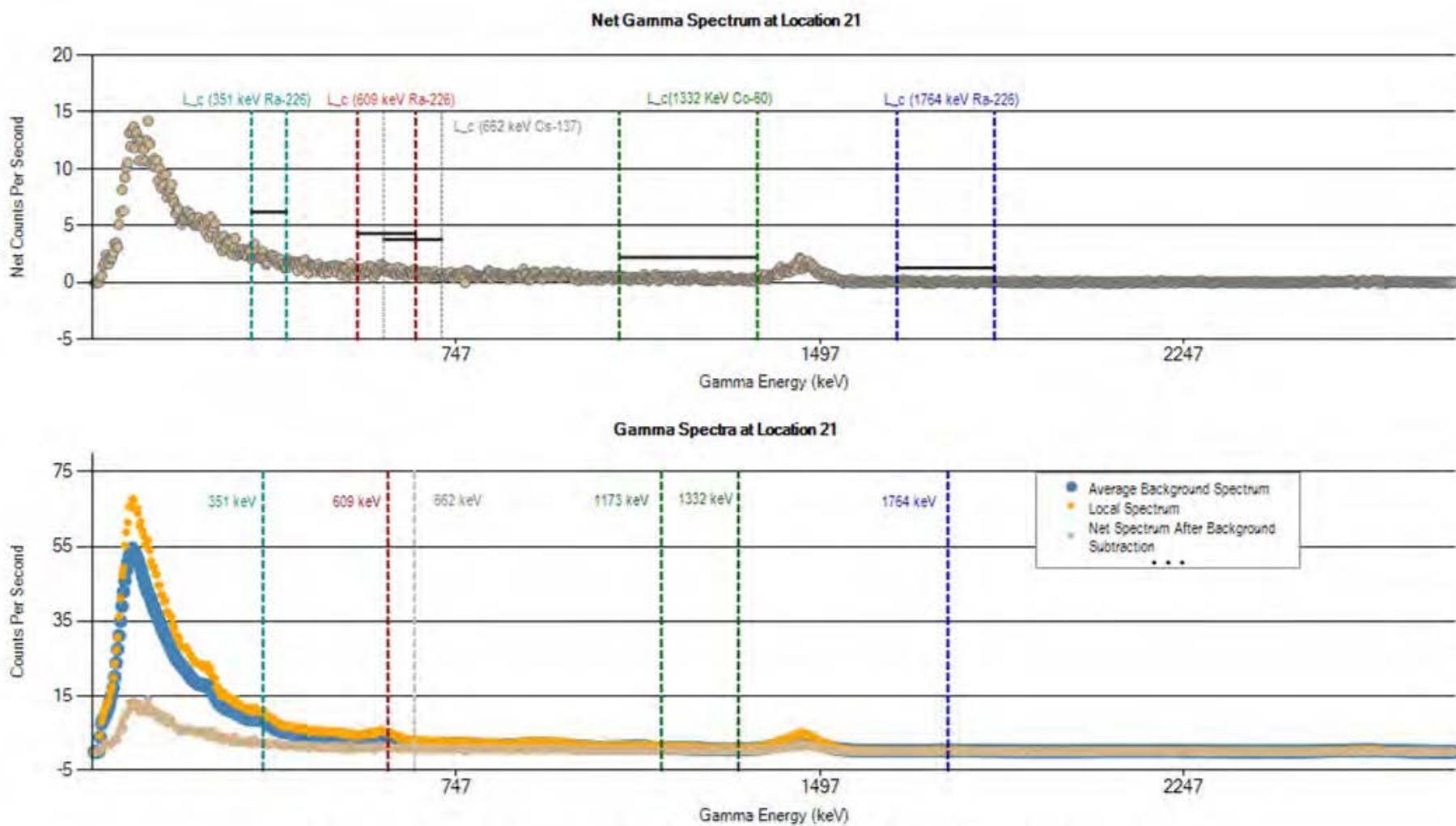
	ROI1	ROI2	ROI3	ROI4	ROI5	ROI6	ROI7	ROI8	ROI9	ROI10
Location 18 (cps)	1088	161	22	25	190	171	135	214	119	4409
Static IL (cps)	1052	150	35	41	201	189	146	229	120	4255



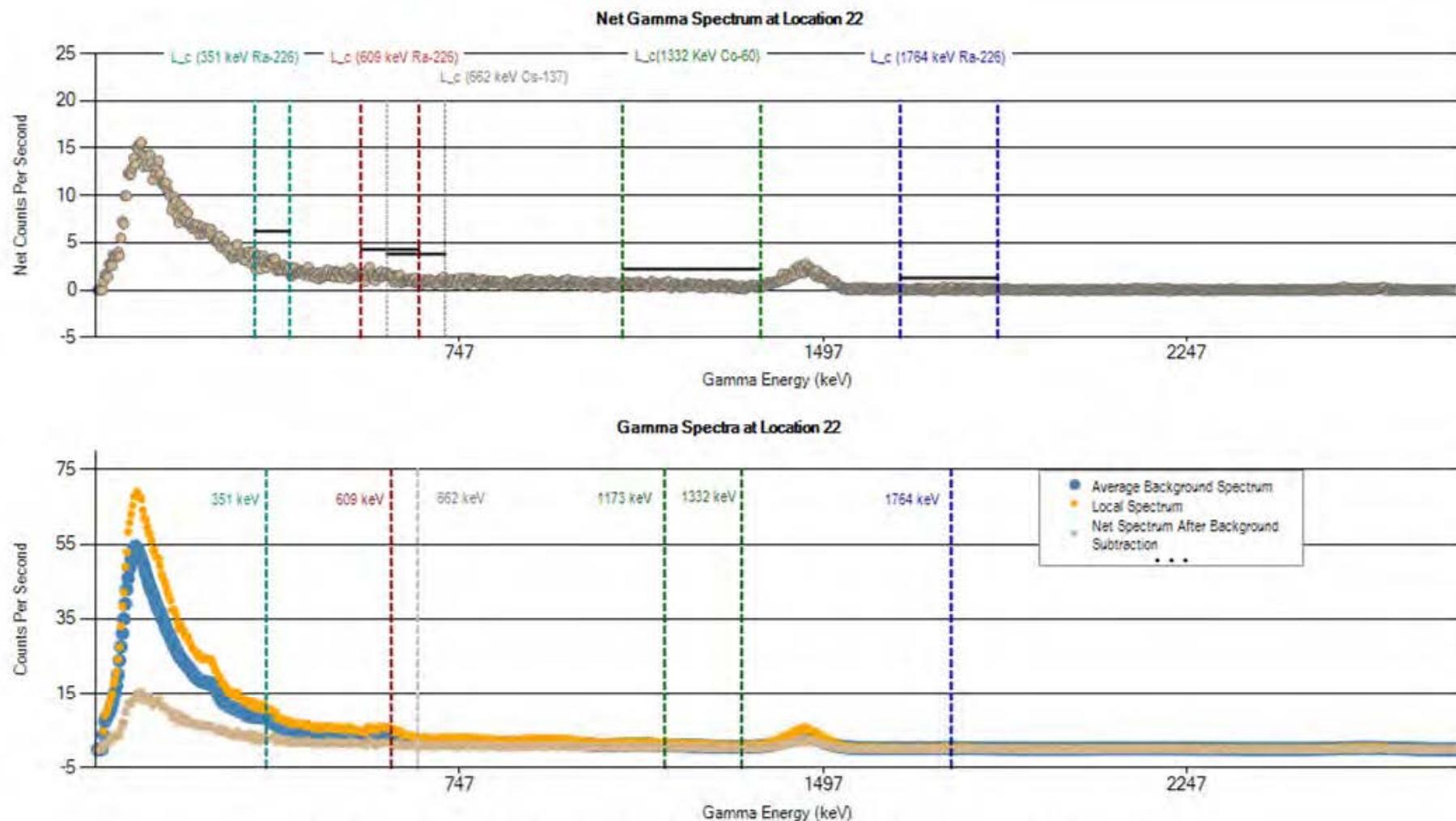
	ROI1	ROI2	ROI3	ROI4	ROI5	ROI6	ROI7	ROI8	ROI9	ROI10
Location 19 (cps)	1179	178	25	28	204	186	145	229	128	4663
Static IL (cps)	1052	150	35	41	201	189	146	229	120	4255



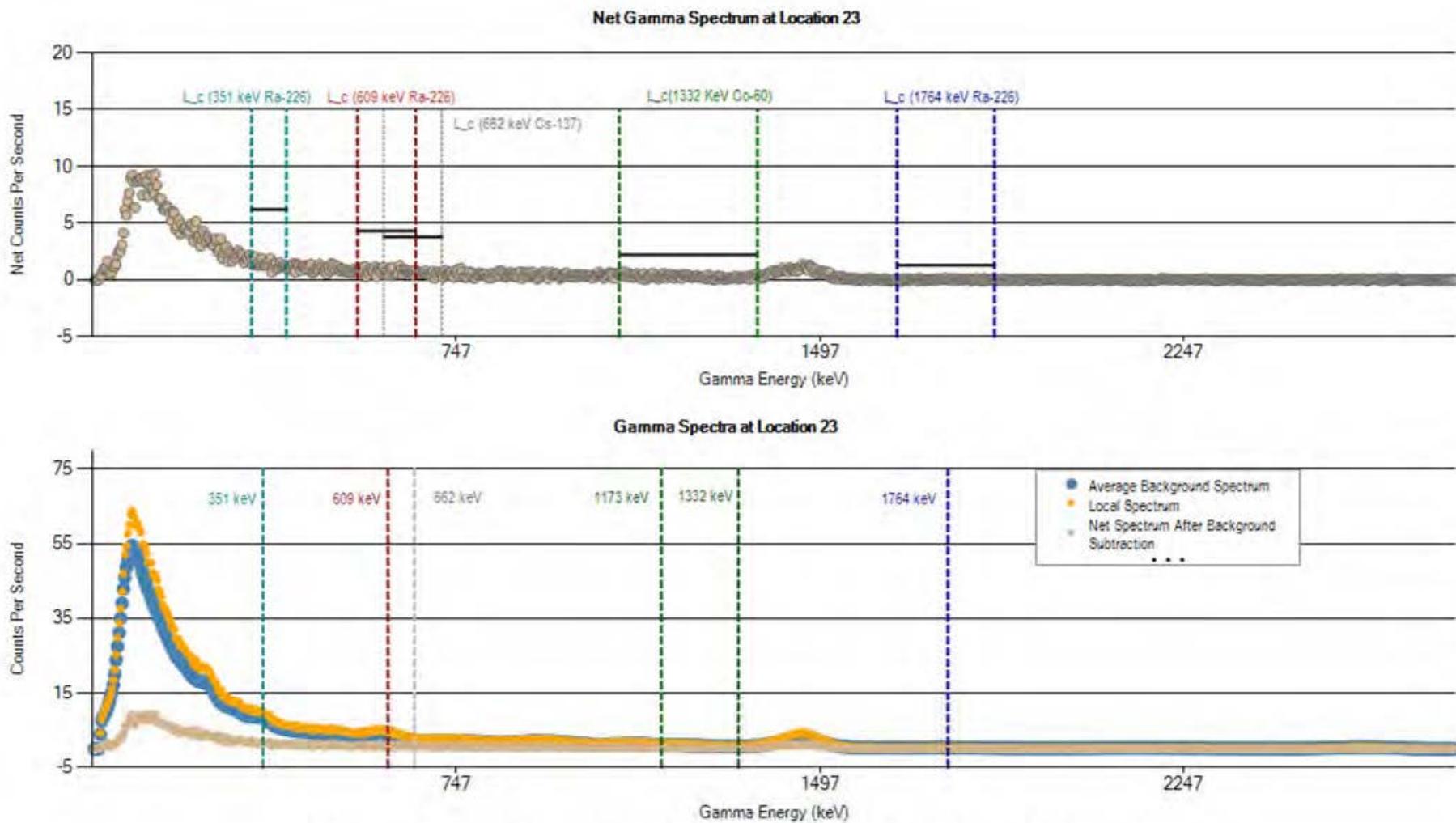
	ROI1	ROI2	ROI3	ROI4	ROI5	ROI6	ROI7	ROI8	ROI9	ROI10
Location 20 (cps)	1052	149	22	25	186	167	131	204	114	4284
Static IL (cps)	1052	150	35	41	201	189	146	229	120	4255



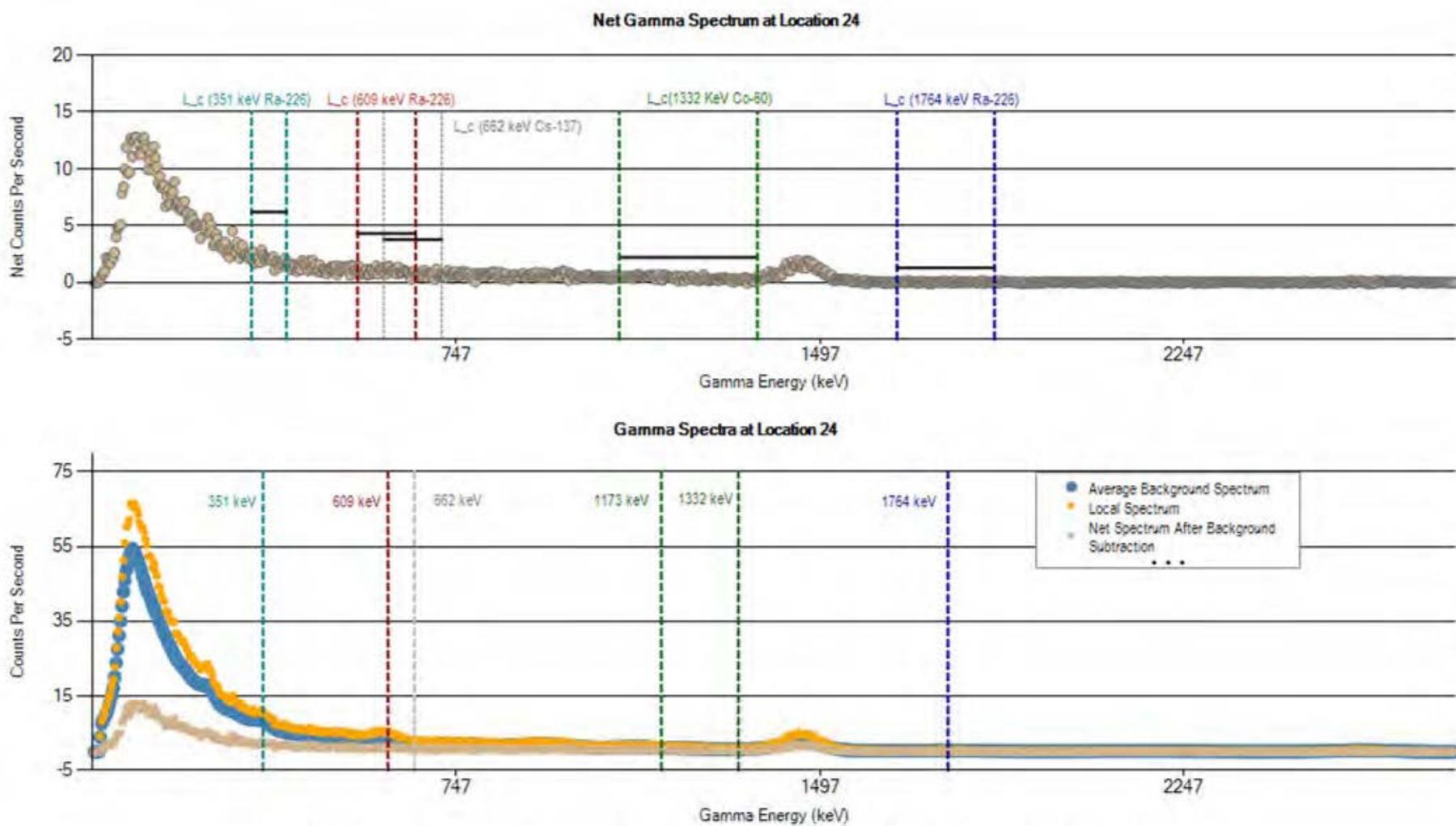
	ROI1	ROI2	ROI3	ROI4	ROI5	ROI6	ROI7	ROI8	ROI9	ROI10
Location 21 (cps)	1136	168	24	29	196	182	142	226	123	4599
Static IL (cps)	1052	150	35	41	201	189	146	229	120	4255



	ROI 1	ROI 2	ROI 3	ROI 4	ROI 5	ROI 6	ROI 7	ROI 8	ROI 9	ROI 10
Location 22 (cps)	1237	190	26	30	214	194	150	241	135	4849
Static IL (cps)	1052	150	35	41	201	189	146	229	120	4255



	ROI1	ROI2	ROI3	ROI4	ROI5	ROI6	ROI7	ROI8	ROI9	ROI10
Location 23 (cps)	1068	156	22	26	187	171	133	209	116	4320
Static IL (cps)	1052	150	35	41	201	189	146	229	120	4255



	ROI1	ROI2	ROI3	ROI4	ROI5	ROI6	ROI7	ROI8	ROI9	ROI10
Location 24 (cps)	1143	172	23	27	195	180	142	223	125	4589
Static IL (cps)	1052	150	35	41	201	189	146	229	120	4255

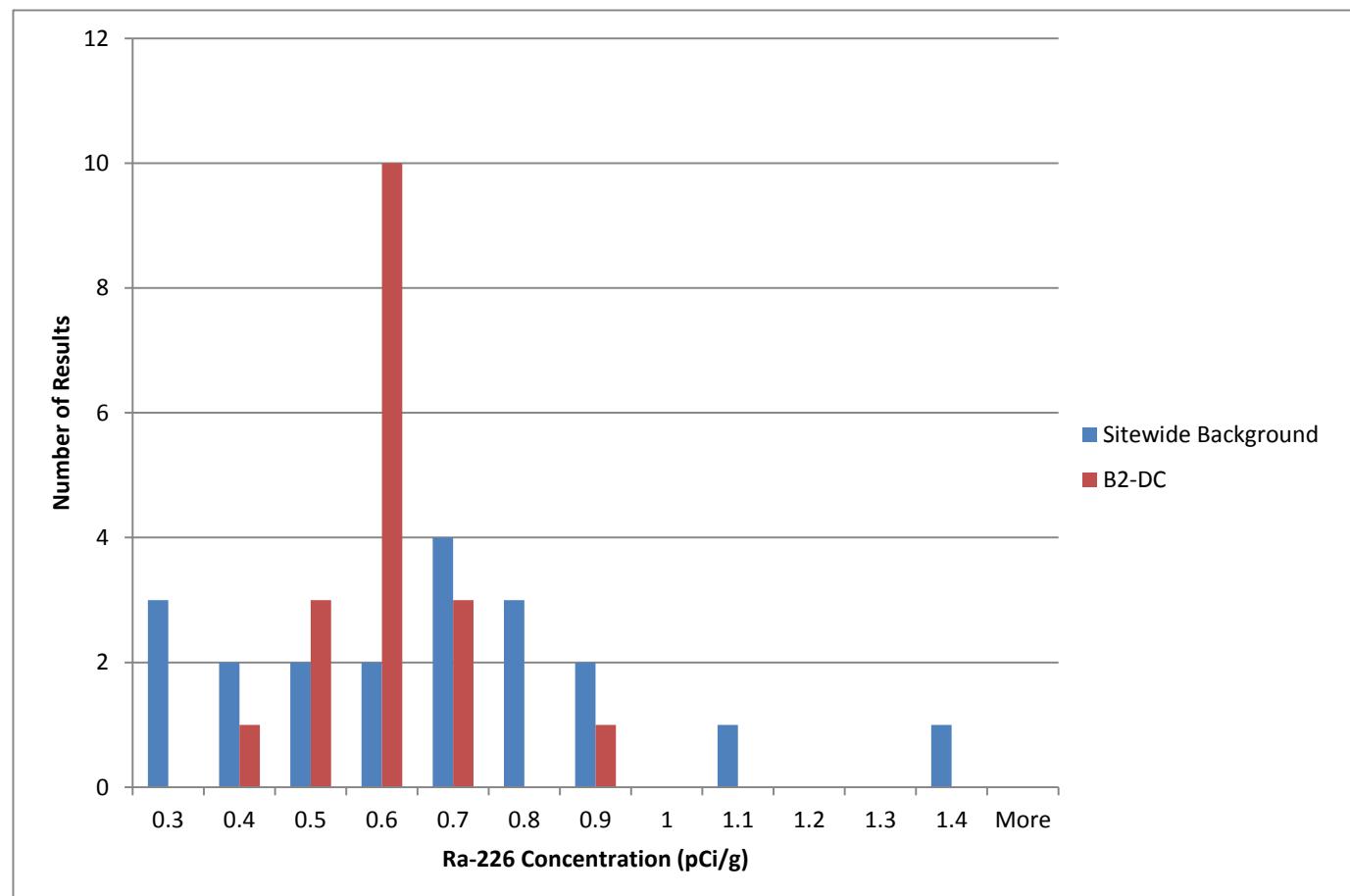
## Histogram, RSY B2 (DC) vs. Sitewide Background

## Background

Bin	Frequency
0.3	3
0.4	2
0.5	2
0.6	2
0.7	4
0.8	3
0.9	2
1	0
1.1	1
1.2	0
1.3	0
1.4	1
More	0

## B2-DC

Bin	Frequency
0.3	0
0.4	1
0.5	3
0.6	10
0.7	3
0.8	0
0.9	1
1	0
1.1	0
1.2	0
1.3	0
1.4	0
More	0



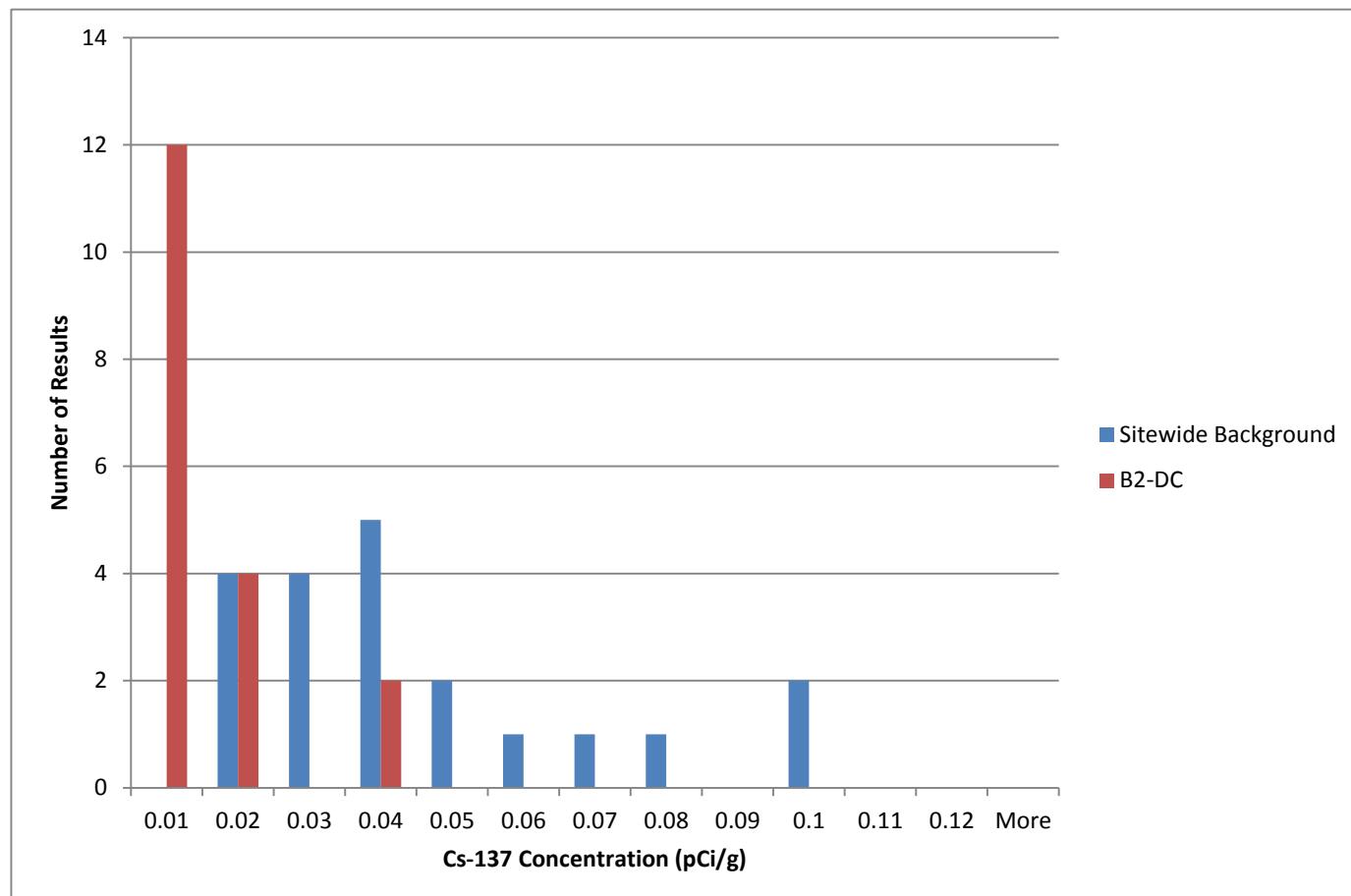
## Histogram, RSY B2 (DC) vs. Sitewide Background

## Background

Bin	Frequency
0.01	0
0.02	4
0.03	4
0.04	5
0.05	2
0.06	1
0.07	1
0.08	1
0.09	0
0.1	2
0.11	0
0.12	0
More	0

## B2-DC

Bin	Frequency
0.01	12
0.02	4
0.03	0
0.04	2
0.05	0
0.06	0
0.07	0
0.08	0
0.09	0
0.1	0
0.11	0
0.12	0
More	0



# TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

## ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica St. Louis  
13715 Rider Trail North  
Earth City, MO 63045  
Tel: (314)298-8566

TestAmerica Job ID: 160-30066-2

Client Project/Site: Hunters Point Naval Shipyard - Parcel E2

For:

Aptim Federal Services LLC  
4005 Port Chicago Hwy, Suite 200  
Concord, California 94520

Attn: Eddie Kalombo

*micha korinhizer*

Authorized for release by:

9/6/2018 2:54:04 PM

Micha Korinhizer, Project Management Assistant II  
(314)298-8566

[micha.korinhizer@testamericainc.com](mailto:micha.korinhizer@testamericainc.com)

Designee for

Rhonda Ridenhower, Manager of Project Management  
(314)298-8566

[rhonda.ridenhower@testamericainc.com](mailto:rhonda.ridenhower@testamericainc.com)

### LINKS

Review your project  
results through

**TotalAccess**

Have a Question?

Ask  
The  
Expert

Visit us at:

[www.testamericainc.com](http://www.testamericainc.com)

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

1

2

3

4

5

6

7

8

9

10

11

12

# Table of Contents

Cover Page .....	1
Table of Contents .....	2
Case Narrative .....	3
Chain of Custody .....	5
Receipt Checklists .....	7
Definitions/Glossary .....	8
Method Summary .....	9
Sample Summary .....	10
Client Sample Results .....	11
QC Sample Results .....	21
QC Association Summary .....	23
Tracer Carrier Summary .....	24

## Case Narrative

Client: Aptim Federal Services LLC

Project/Site: Hunters Point Naval Shipyard - Parcel E2

TestAmerica Job ID: 160-30066-2

**Job ID: 160-30066-2**

**Laboratory: TestAmerica St. Louis**

**Narrative**

### CASE NARRATIVE

**Client: Aptim Federal Services LLC**

**Project: Hunters Point Naval Shipyard - Parcel E2**

**Report Number: 160-30066-2**

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

TestAmerica St. Louis attests to the validity of the laboratory data generated by TestAmerica facilities reported herein. All analyses performed by TestAmerica facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the application methods. TestAmerica's operations groups have reviewed the data for compliance with the laboratory QA/QC plan, and data have been found to be compliant with laboratory protocols unless otherwise noted below.

The test results in this report meet all NELAP requirements for parameters for which accreditation is required or available. Any exceptions to NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

All solid sample results for Chemistry analyses are reported on an "as received" basis unless otherwise indicated by the presence of a % solids value in the method header. All soil/sediment sample results for radiochemistry analyses are based upon sample as dried and disaggregated with the exception of tritium, carbon-14, and iodine-129 by gamma spectroscopy unless requested as wet weight by the client.

Any minimum detectable concentration (MDC), critical value (DLC), or Safe Drinking Water Act detection limit (SDWA DL) is sample-specific unless otherwise stated elsewhere in this narrative.

Reference the chain of custody and condition upon receipt report for any variations on receipt conditions and temperature of samples on receipt.

Manual Integrations were performed only when necessary and are in compliance with the laboratory's standard operating procedure. Detailed information can be found in the raw data section of the level IV report.

The following clean-up methods for Organic analyses may have been used on the samples in this data set. Specific methods employed are documented on the batch extraction logs:

Method 3600C: Cleanup

Method 3620C: Florisil Cleanup

Method 3630C: Silica Gel Cleanup

Method 3640A: Gel-Permeation Cleanup

Method 3650B: Acid-Base Partition Cleanup

Method 3660B: Sulfur Cleanup

## Case Narrative

Client: Aptim Federal Services LLC

Project/Site: Hunters Point Naval Shipyard - Parcel E2

TestAmerica Job ID: 160-30066-2

### **Job ID: 160-30066-2 (Continued)**

#### **Laboratory: TestAmerica St. Louis (Continued)**

Method 3665A: Sulfuric Acid/Permanganate Cleanup

This laboratory report is confidential and is intended for the sole use of TestAmerica and its client.

#### **RECEIPT**

The samples were received on 08/09/2018; the samples arrived in good condition, properly preserved. The temperature of the coolers at receipt was 20.0° C.

#### **TOTAL BETA STRONTIUM (GFPC)**

Samples PE2-RSYB2-DC-S001 (160-30066-1) and PE2-RSYB2-DC-S011 (160-30066-11) were analyzed for Total Beta Strontium (GFPC) in accordance with EPA 905. The samples were dried on 08/09/2018, prepared on 08/16/2018 and analyzed on 09/05/2018.

The following samples in batch 160-382925 could not be thoroughly homogenized before sub-sampling was performed due to sample matrix: PE2-RSYB2-DC-S001 (160-30066-1) and PE2-RSYB2-DC-S011 (160-30066-11). The samples contained detritus material and rocks of varying sizes.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

#### **RADIUM-226 BY GAMMA SPEC (21 DAY INGROWTH)**

Samples PE2-RSYB2-DC-S001 (160-30066-1), PE2-RSYB2-DC-S002 (160-30066-2), PE2-RSYB2-DC-S003 (160-30066-3), PE2-RSYB2-DC-S004 (160-30066-4), PE2-RSYB2-DC-S005 (160-30066-5), PE2-RSYB2-DC-S006 (160-30066-6), PE2-RSYB2-DC-S007 (160-30066-7), PE2-RSYB2-DC-S008 (160-30066-8), PE2-RSYB2-DC-S009 (160-30066-9), PE2-RSYB2-DC-S010 (160-30066-10), PE2-RSYB2-DC-S011 (160-30066-11), PE2-RSYB2-DC-S012 (160-30066-12), PE2-RSYB2-DC-S013 (160-30066-13), PE2-RSYB2-DC-S014 (160-30066-14), PE2-RSYB2-DC-S015 (160-30066-15), PE2-RSYB2-DC-S016 (160-30066-16), PE2-RSYB2-DC-S017 (160-30066-17) and PE2-RSYB2-DC-S018 (160-30066-18) were analyzed for Radium-226 by gamma spec (21 day ingrowth) in accordance with EPA GA\_01\_R. The samples were dried on 08/09/2018, prepared on 08/10/2018 and analyzed on 08/31/2018.

The cesium-137 detection goal of 0.0700 pCi/g was not met for samples PE2-RSYB2-DC-S006 (160-30066-6), PE2-RSYB2-DC-S009 (160-30066-9), PE2-RSYB2-DC-S011 (160-30066-11) and PE2-RSYB2-DC-S013 (160-30066-13) in batch 160-381619. This is caused by statistical fluctuations in the Compton background due to low level activity in the samples in conjunction with the software attempting to fit a peak into the noise of this baseline.

The following sample exhibited a negative result greater in magnitude than the 3 sigma TPU: PE2-RSYB2-DC-S006 (160-30066-6) This occurrence was evaluated and determined to be random in nature. Sporadic occurrences such as this are statistically expected. No further action is required.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

# CHAIN OF CUSTODY



APTIM Federal Services, LLC

4005 Port Chicago Hwy  
Concord, CA 94520

Project Number: 500506

CTO-013 RSYB2 Deconstruction  
Systematic

Project Name: CTO-013 RSYB2 Deconstruction

Project Location: HPSN - Parcel E-2

Purchase Order #: 202296

Project Manager: *Nels Johnson*

(Name &amp; phone #)

Send Report To: *Eddie Kalambho*

Phone/Fax Number: 415-987-0760

Address: 4005 Port Chicago Hwy

City: Concord, CA, 94520

Sampler's Name(s): *Douglas D. Johnson*

Collection Information					
Sample ID Number	Sample Description	Date	Time	Method	Container Type
PE2-RSYB2-DC-S001	Parcel E-2 RSYB2 Deconstruction Systematic	8/1/18	12:55	G	SO 1
PE2-RSYB2-DC-S002	Parcel E-2 RSYB2 Deconstruction Systematic	8/1/18	12:42	G	SO 1
PE2-RSYB2-DC-S003	Parcel E-2 RSYB2 Deconstruction Systematic	8/1/18	12:41	G	SO 1
PE2-RSYB2-DC-S004	Parcel E-2 RSYB2 Deconstruction Systematic	8/1/18	12:54	G	SO 1
PE2-RSYB2-DC-S005	Parcel E-2 RSYB2 Deconstruction Systematic	8/1/18	13:01	G	SO 1
PE2-RSYB2-DC-S006	Parcel E-2 RSYB2 Deconstruction Systematic	8/1/18	13:08	G	SO 1
PE2-RSYB2-DC-S007	Parcel E-2 RSYB2 Deconstruction Systematic	8/1/18	13:11	G	SO 1
PE2-RSYB2-DC-S008	Parcel E-2 RSYB2 Deconstruction Systematic	8/1/18	13:22	G	SO 1
PE2-RSYB2-DC-S009	Parcel E-2 RSYB2 Deconstruction Systematic	8/1/18	13:33	G	SO 1
PE2-RSYB2-DC-S010	Parcel E-2 RSYB2 Deconstruction Systematic	8/1/18	13:40	G	SO 1

## Special Instructions:

7 days ingrown draft and follow with 21 days final.

Analyze for Total Strontium as a screening step, and isotopic Sr-90 only if Total Strontium is above project action limit of 0.331 pCi/g.

Standard TAT -10-day	24-hr	2-day	10-day	I	II	III	Project Specific:	Level Of QC Required:
Relinquished By: <i>Jason Rangel</i>	Date: 8/1/18 Time: 15:00	Received By: <i>M. H. S. L. CHI</i>	Date: 8/1/18 Time: 15:00	Method Codes	C = Composite	G = Grab		
Relinquished By: <i>M. H. S. L. CHI</i>	Date: 8/1/18 Time: 14:00	Received By: <i>Mark Johnson</i>	Date: 8/1/18 Time: 14:00	Matrix Codes	DW = Drinking Water GW = Ground Water WW = Waste Water	A = Air	SO = Soil SL = Sludge CP = Chip Samples ADS=Asbestos, PO=Pipe Opening	
Relinquished By: <i>M. H. S. L. CHI</i>	Date: 8/1/18 Time: 14:00	Received By: <i>Mark Johnson</i>	Date: 8/1/18 Time: 14:00					
Relinquished By: <i>M. H. S. L. CHI</i>	Date: 8/1/18 Time: 14:00	Received By: <i>Mark Johnson</i>	Date: 8/1/18 Time: 14:00					



160-30066 Chain of Custody

 1  
2  
3  
4  
5  
6  
7  
8  
9  
10  
11  
12



## Login Sample Receipt Checklist

Client: Aptim Federal Services LLC

Job Number: 160-30066-2

**Login Number: 30066****List Source: TestAmerica St. Louis****List Number: 1****Creator: Press, Nicholas B**

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	N/A	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

## Definitions/Glossary

Client: Aptim Federal Services LLC  
 Project/Site: Hunters Point Naval Shipyard - Parcel E2

TestAmerica Job ID: 160-30066-2

### **Qualifiers**

#### **Rad**

<b>Qualifier</b>	<b>Qualifier Description</b>
U	Undetected at the Limit of Detection.

### **Glossary**

#### **Abbreviation** **These commonly used abbreviations may or may not be present in this report.**

□	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

## Method Summary

Client: Aptim Federal Services LLC

Project/Site: Hunters Point Naval Shipyard - Parcel E2

TestAmerica Job ID: 160-30066-2

Method	Method Description	Protocol	Laboratory
905.0	Total Beta Strontium (GFPC)	DOE	TAL SL
GA-01-R	Radium-226 & Other Gamma Emitters (GS)	DOE	TAL SL
DPS-0	Preparation, Digestion/ Precipitate	None	TAL SL
Dry and Grind	Preparation, Dry and Grind	None	TAL SL
Fill_Geo-21	Fill Geometry, 21-Day In-Growth	None	TAL SL

**Protocol References:**

DOE = U.S. Department of Energy

None = None

**Laboratory References:**

TAL SL = TestAmerica St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

1

2

3

4

5

6

7

8

9

10

11

12

## Sample Summary

Client: Aptim Federal Services LLC

Project/Site: Hunters Point Naval Shipyard - Parcel E2

TestAmerica Job ID: 160-30066-2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
160-30066-1	PE2-RSYB2-DC-S001	Solid	08/01/18 12:35	08/09/18 08:30
160-30066-2	PE2-RSYB2-DC-S002	Solid	08/01/18 12:42	08/09/18 08:30
160-30066-3	PE2-RSYB2-DC-S003	Solid	08/01/18 12:49	08/09/18 08:30
160-30066-4	PE2-RSYB2-DC-S004	Solid	08/01/18 12:54	08/09/18 08:30
160-30066-5	PE2-RSYB2-DC-S005	Solid	08/01/18 13:01	08/09/18 08:30
160-30066-6	PE2-RSYB2-DC-S006	Solid	08/01/18 13:08	08/09/18 08:30
160-30066-7	PE2-RSYB2-DC-S007	Solid	08/01/18 13:19	08/09/18 08:30
160-30066-8	PE2-RSYB2-DC-S008	Solid	08/01/18 13:26	08/09/18 08:30
160-30066-9	PE2-RSYB2-DC-S009	Solid	08/01/18 13:33	08/09/18 08:30
160-30066-10	PE2-RSYB2-DC-S010	Solid	08/01/18 13:40	08/09/18 08:30
160-30066-11	PE2-RSYB2-DC-S011	Solid	08/01/18 13:47	08/09/18 08:30
160-30066-12	PE2-RSYB2-DC-S012	Solid	08/01/18 13:54	08/09/18 08:30
160-30066-13	PE2-RSYB2-DC-S013	Solid	08/01/18 13:59	08/09/18 08:30
160-30066-14	PE2-RSYB2-DC-S014	Solid	08/01/18 14:06	08/09/18 08:30
160-30066-15	PE2-RSYB2-DC-S015	Solid	08/01/18 14:13	08/09/18 08:30
160-30066-16	PE2-RSYB2-DC-S016	Solid	08/01/18 14:18	08/09/18 08:30
160-30066-17	PE2-RSYB2-DC-S017	Solid	08/01/18 14:24	08/09/18 08:30
160-30066-18	PE2-RSYB2-DC-S018	Solid	08/01/18 14:30	08/09/18 08:30

# Client Sample Results

Client: Aptim Federal Services LLC

Project/Site: Hunters Point Naval Shipyard - Parcel E2

TestAmerica Job ID: 160-30066-2

**Client Sample ID: PE2-RSYB2-DC-S001**

Date Collected: 08/01/18 12:35

Date Received: 08/09/18 08:30

**Lab Sample ID: 160-30066-1**

Matrix: Solid

**Method: 905.0 - Total Beta Strontium (GFPC)**

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Total Beta Strontium	0.0237	U	0.0611	0.0612	0.331	0.0480	pCi/g	08/16/18 12:28	09/05/18 05:45	1
<i>Carrier</i>	%Yield	Qualifier	<i>Limits</i>					<i>Prepared</i>	<i>Analyzed</i>	<i>Dil Fac</i>
Sr Carrier	80.3		40 - 110					08/16/18 12:28	09/05/18 05:45	1

**Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)**

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
<b>Actinium 228</b>	<b>0.680</b>		0.220	0.231		0.0642	pCi/g	08/10/18 14:23	08/31/18 05:43	1
Actinium-227	-0.0435	U	0.612	0.612		0.432	pCi/g	08/10/18 14:23	08/31/18 05:43	1
Bismuth-212	0.384	U	0.784	0.785		0.611	pCi/g	08/10/18 14:23	08/31/18 05:43	1
<b>Bismuth-214</b>	<b>0.616</b>		0.155	0.168		0.0556	pCi/g	08/10/18 14:23	08/31/18 05:43	1
Cesium-137	-0.00271	U	0.0855	0.0855	0.0700	0.0509	pCi/g	08/10/18 14:23	08/31/18 05:43	1
Cobalt-60	-0.00842	U	0.0762	0.0762	0.200	0.0385	pCi/g	08/10/18 14:23	08/31/18 05:43	1
<b>Lead-210</b>	<b>1.15</b>		1.29	1.30		0.866	pCi/g	08/10/18 14:23	08/31/18 05:43	1
<b>Lead-212</b>	<b>0.507</b>		0.104	0.123		0.0565	pCi/g	08/10/18 14:23	08/31/18 05:43	1
<b>Lead-214</b>	<b>0.612</b>		0.129	0.144		0.0479	pCi/g	08/10/18 14:23	08/31/18 05:43	1
<b>Potassium-40</b>	<b>13.6</b>		1.69	2.19		0.230	pCi/g	08/10/18 14:23	08/31/18 05:43	1
Protactinium-231	-0.749	U	2.73	2.74		2.23	pCi/g	08/10/18 14:23	08/31/18 05:43	1
<b>Radium-226</b>	<b>0.616</b>		0.155	0.168	0.700	0.0556	pCi/g	08/10/18 14:23	08/31/18 05:43	1
<b>Radium-228</b>	<b>0.680</b>		0.220	0.231		0.0642	pCi/g	08/10/18 14:23	08/31/18 05:43	1
<b>Thallium-208</b>	<b>0.225</b>		0.0594	0.0638		0.0194	pCi/g	08/10/18 14:23	08/31/18 05:43	1
<b>Thorium-228</b>	<b>0.507</b>		0.104	0.123		0.0565	pCi/g	08/10/18 14:23	08/31/18 05:43	1
<b>Thorium-232</b>	<b>0.680</b>		0.220	0.231		0.0642	pCi/g	08/10/18 14:23	08/31/18 05:43	1
Thorium-234	0.224	U	1.36	1.36		1.11	pCi/g	08/10/18 14:23	08/31/18 05:43	1
Uranium-235	0.198	U	0.295	0.296		0.258	pCi/g	08/10/18 14:23	08/31/18 05:43	1
Uranium-238	0.224	U	1.36	1.36		1.11	pCi/g	08/10/18 14:23	08/31/18 05:43	1

**Client Sample ID: PE2-RSYB2-DC-S002**

Date Collected: 08/01/18 12:42

Date Received: 08/09/18 08:30

**Lab Sample ID: 160-30066-2**

Matrix: Solid

**Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)**

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
<b>Actinium 228</b>	<b>0.393</b>		0.151	0.156		0.0339	pCi/g	08/10/18 14:23	08/31/18 05:44	1
Actinium-227	0.0540	U	0.113	0.113		0.699	pCi/g	08/10/18 14:23	08/31/18 05:44	1
Bismuth-212	0.448	U	0.799	0.800		0.613	pCi/g	08/10/18 14:23	08/31/18 05:44	1
<b>Bismuth-214</b>	<b>0.645</b>		0.161	0.174		0.0572	pCi/g	08/10/18 14:23	08/31/18 05:44	1
Cesium-137	0.0154	U	0.0438	0.0438	0.0700	0.0337	pCi/g	08/10/18 14:23	08/31/18 05:44	1
<b>Cobalt-60</b>	<b>0.0470</b>		0.0378	0.0380	0.200	0.0339	pCi/g	08/10/18 14:23	08/31/18 05:44	1
<b>Lead-210</b>	<b>1.67</b>		1.30	1.31		0.769	pCi/g	08/10/18 14:23	08/31/18 05:44	1
<b>Lead-212</b>	<b>0.546</b>		0.103	0.125		0.0477	pCi/g	08/10/18 14:23	08/31/18 05:44	1
<b>Lead-214</b>	<b>0.654</b>		0.145	0.160		0.0581	pCi/g	08/10/18 14:23	08/31/18 05:44	1
<b>Potassium-40</b>	<b>10.9</b>		1.65	1.99		0.274	pCi/g	08/10/18 14:23	08/31/18 05:44	1
Protactinium-231	0.741	U	2.25	2.25		2.46	pCi/g	08/10/18 14:23	08/31/18 05:44	1

# Client Sample Results

Client: Aptim Federal Services LLC

Project/Site: Hunters Point Naval Shipyard - Parcel E2

TestAmerica Job ID: 160-30066-2

**Client Sample ID: PE2-RSYB2-DC-S002**

Date Collected: 08/01/18 12:42

Date Received: 08/09/18 08:30

**Lab Sample ID: 160-30066-2**

Matrix: Solid

**Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)**

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Radium-226	0.645		0.161	0.174	0.700	0.0572	pCi/g	08/10/18 14:23	08/31/18 05:44	1
Radium-228	0.393		0.151	0.156		0.0339	pCi/g	08/10/18 14:23	08/31/18 05:44	1
Thallium-208	0.221		0.0574	0.0618		0.0127	pCi/g	08/10/18 14:23	08/31/18 05:44	1
Thorium-228	0.546		0.103	0.125		0.0477	pCi/g	08/10/18 14:23	08/31/18 05:44	1
<b>Thorium-232</b>	<b>0.393</b>		0.151	0.156		0.0339	pCi/g	08/10/18 14:23	08/31/18 05:44	1
Thorium-234	0.0770 U		1.62	1.62		1.33	pCi/g	08/10/18 14:23	08/31/18 05:44	1
Uranium-235	0.110 U		0.587	0.587		0.481	pCi/g	08/10/18 14:23	08/31/18 05:44	1
Uranium-238	0.0770 U		1.62	1.62		1.33	pCi/g	08/10/18 14:23	08/31/18 05:44	1

**Client Sample ID: PE2-RSYB2-DC-S003**

Date Collected: 08/01/18 12:49

Date Received: 08/09/18 08:30

**Lab Sample ID: 160-30066-3**

Matrix: Solid

**Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)**

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
<b>Actinium 228</b>	<b>0.892</b>		0.149	0.175		0.0526	pCi/g	08/10/18 14:23	08/31/18 05:46	1
Actinium-227	0.284 U		0.628	0.629		0.423	pCi/g	08/10/18 14:23	08/31/18 05:46	1
Bismuth-212	0.147 U		0.789	0.790		0.640	pCi/g	08/10/18 14:23	08/31/18 05:46	1
<b>Bismuth-214</b>	<b>0.608</b>		0.161	0.173		0.0663	pCi/g	08/10/18 14:23	08/31/18 05:46	1
Cesium-137	-0.0389 U		0.0776	0.0777	0.0700	0.0615	pCi/g	08/10/18 14:23	08/31/18 05:46	1
Cobalt-60	0.0227 U		0.0501	0.0502	0.200	0.0380	pCi/g	08/10/18 14:23	08/31/18 05:46	1
<b>Lead-210</b>	<b>1.29</b>		1.21	1.22		0.817	pCi/g	08/10/18 14:23	08/31/18 05:46	1
<b>Lead-212</b>	<b>0.703</b>		0.108	0.141		0.0525	pCi/g	08/10/18 14:23	08/31/18 05:46	1
<b>Lead-214</b>	<b>0.681</b>		0.119	0.138		0.0579	pCi/g	08/10/18 14:23	08/31/18 05:46	1
<b>Potassium-40</b>	<b>16.1</b>		1.65	2.34		0.255	pCi/g	08/10/18 14:23	08/31/18 05:46	1
Protactinium-231	0.000 U		0.462	0.462		2.19	pCi/g	08/10/18 14:23	08/31/18 05:46	1
<b>Radium-226</b>	<b>0.608</b>		0.161	0.173	0.700	0.0663	pCi/g	08/10/18 14:23	08/31/18 05:46	1
Radium-228	0.892		0.149	0.175		0.0526	pCi/g	08/10/18 14:23	08/31/18 05:46	1
Thallium-208	0.241		0.0663	0.0708		0.0256	pCi/g	08/10/18 14:23	08/31/18 05:46	1
Thorium-228	0.703		0.108	0.141		0.0525	pCi/g	08/10/18 14:23	08/31/18 05:46	1
<b>Thorium-232</b>	<b>0.892</b>		0.149	0.175		0.0526	pCi/g	08/10/18 14:23	08/31/18 05:46	1
Thorium-234	0.294 U		0.304	0.305		1.18	pCi/g	08/10/18 14:23	08/31/18 05:46	1
Uranium-235	-0.0402 U		0.0580	0.0581		0.348	pCi/g	08/10/18 14:23	08/31/18 05:46	1
Uranium-238	0.294 U		0.304	0.305		1.18	pCi/g	08/10/18 14:23	08/31/18 05:46	1

**Client Sample ID: PE2-RSYB2-DC-S004**

Date Collected: 08/01/18 12:54

Date Received: 08/09/18 08:30

**Lab Sample ID: 160-30066-4**

Matrix: Solid

**Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)**

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
<b>Actinium 228</b>	<b>0.661</b>		0.199	0.210		0.0350	pCi/g	08/10/18 14:23	08/31/18 05:43	1
Actinium-227	0.326 U		0.754	0.755		0.605	pCi/g	08/10/18 14:23	08/31/18 05:43	1
Bismuth-212	-0.439 U		0.661	0.662		0.918	pCi/g	08/10/18 14:23	08/31/18 05:43	1

# Client Sample Results

Client: Aptim Federal Services LLC

Project/Site: Hunters Point Naval Shipyard - Parcel E2

TestAmerica Job ID: 160-30066-2

**Client Sample ID: PE2-RSYB2-DC-S004**

Date Collected: 08/01/18 12:54

Date Received: 08/09/18 08:30

**Lab Sample ID: 160-30066-4**

Matrix: Solid

**Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)**

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Bismuth-214	0.719		0.166	0.181		0.0555	pCi/g	08/10/18 14:23	08/31/18 05:43	1
Cesium-137	0.0410	U	0.0666	0.0668	0.0700	0.0506	pCi/g	08/10/18 14:23	08/31/18 05:43	1
Cobalt-60	0.0357		0.0715	0.0716	0.200	0.0328	pCi/g	08/10/18 14:23	08/31/18 05:43	1
Lead-210	-1.02	U	2.13	2.13		1.78	pCi/g	08/10/18 14:23	08/31/18 05:43	1
Lead-212	0.540		0.112	0.126		0.0568	pCi/g	08/10/18 14:23	08/31/18 05:43	1
Lead-214	0.572		0.147	0.158		0.0658	pCi/g	08/10/18 14:23	08/31/18 05:43	1
Potassium-40	10.3		1.63	1.93		0.387	pCi/g	08/10/18 14:23	08/31/18 05:43	1
Protactinium-231	0.745	U	2.26	2.26		2.47	pCi/g	08/10/18 14:23	08/31/18 05:43	1
Radium-226	0.719		0.166	0.181	0.700	0.0555	pCi/g	08/10/18 14:23	08/31/18 05:43	1
Radium-228	0.661		0.199	0.210		0.0350	pCi/g	08/10/18 14:23	08/31/18 05:43	1
Thallium-208	0.194		0.0689	0.0717		0.0281	pCi/g	08/10/18 14:23	08/31/18 05:43	1
Thorium-228	0.540		0.112	0.126		0.0568	pCi/g	08/10/18 14:23	08/31/18 05:43	1
Thorium-232	0.661		0.199	0.210		0.0350	pCi/g	08/10/18 14:23	08/31/18 05:43	1
Thorium-234	-0.0264	U	1.68	1.68		1.38	pCi/g	08/10/18 14:23	08/31/18 05:43	1
Uranium-235	0.262	U	0.440	0.440		0.508	pCi/g	08/10/18 14:23	08/31/18 05:43	1
Uranium-238	-0.0264	U	1.68	1.68		1.38	pCi/g	08/10/18 14:23	08/31/18 05:43	1

**Client Sample ID: PE2-RSYB2-DC-S005**

Date Collected: 08/01/18 13:01

Date Received: 08/09/18 08:30

**Lab Sample ID: 160-30066-5**

Matrix: Solid

**Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)**

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Actinium 228	0.637		0.170	0.182		0.0627	pCi/g	08/10/18 14:23	08/31/18 05:44	1
Actinium-227	-0.0654	U	0.133	0.133		0.701	pCi/g	08/10/18 14:23	08/31/18 05:44	1
Bismuth-212	-0.0621	U	1.62	1.62		0.601	pCi/g	08/10/18 14:23	08/31/18 05:44	1
Bismuth-214	0.634		0.132	0.148		0.0296	pCi/g	08/10/18 14:23	08/31/18 05:44	1
Cesium-137	-0.0387	U	0.133	0.133	0.0700	0.0647	pCi/g	08/10/18 14:23	08/31/18 05:44	1
Cobalt-60	-0.0273	U	0.0798	0.0799	0.200	0.0489	pCi/g	08/10/18 14:23	08/31/18 05:44	1
Lead-210	0.748	U	1.70	1.70		1.36	pCi/g	08/10/18 14:23	08/31/18 05:44	1
Lead-212	0.468		0.0963	0.114		0.0471	pCi/g	08/10/18 14:23	08/31/18 05:44	1
Lead-214	0.481		0.118	0.129		0.0400	pCi/g	08/10/18 14:23	08/31/18 05:44	1
Potassium-40	10.4		1.57	1.90		0.261	pCi/g	08/10/18 14:23	08/31/18 05:44	1
Protactinium-231	0.000	U	0.689	0.689		2.29	pCi/g	08/10/18 14:23	08/31/18 05:44	1
Radium-226	0.634		0.132	0.148	0.700	0.0296	pCi/g	08/10/18 14:23	08/31/18 05:44	1
Radium-228	0.637		0.170	0.182		0.0627	pCi/g	08/10/18 14:23	08/31/18 05:44	1
Thallium-208	0.182		0.0533	0.0565		0.0159	pCi/g	08/10/18 14:23	08/31/18 05:44	1
Thorium-228	0.468		0.0963	0.114		0.0471	pCi/g	08/10/18 14:23	08/31/18 05:44	1
Thorium-232	0.637		0.170	0.182		0.0627	pCi/g	08/10/18 14:23	08/31/18 05:44	1
Thorium-234	1.40		1.25	1.26		0.746	pCi/g	08/10/18 14:23	08/31/18 05:44	1
Uranium-235	-0.228	U	0.310	0.311		0.412	pCi/g	08/10/18 14:23	08/31/18 05:44	1
Uranium-238	1.40		1.25	1.26		0.746	pCi/g	08/10/18 14:23	08/31/18 05:44	1

# Client Sample Results

Client: Aptim Federal Services LLC

Project/Site: Hunters Point Naval Shipyard - Parcel E2

TestAmerica Job ID: 160-30066-2

**Client Sample ID: PE2-RSYB2-DC-S006**

Date Collected: 08/01/18 13:08

Date Received: 08/09/18 08:30

**Lab Sample ID: 160-30066-6**

Matrix: Solid

**Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)**

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
<b>Actinium 228</b>	<b>0.581</b>		0.219	0.227		0.206	pCi/g	08/10/18 14:23	08/31/18 05:45	1
Actinium-227	0.297	U	0.782	0.783		0.529	pCi/g	08/10/18 14:23	08/31/18 05:45	1
Bismuth-212	0.522	U	1.05	1.06		0.825	pCi/g	08/10/18 14:23	08/31/18 05:45	1
<b>Bismuth-214</b>	<b>0.643</b>		0.144	0.159		0.0310	pCi/g	08/10/18 14:23	08/31/18 05:45	1
Cesium-137	-0.0351	U	0.0597	0.0598	0.0700	0.0702	pCi/g	08/10/18 14:23	08/31/18 05:45	1
Cobalt-60	0.0178	U	0.0732	0.0733	0.200	0.0358	pCi/g	08/10/18 14:23	08/31/18 05:45	1
Lead-210	0.0738	U	1.73	1.73		1.21	pCi/g	08/10/18 14:23	08/31/18 05:45	1
<b>Lead-212</b>	<b>0.724</b>		0.119	0.152		0.0490	pCi/g	08/10/18 14:23	08/31/18 05:45	1
<b>Lead-214</b>	<b>0.739</b>		0.139	0.159		0.0606	pCi/g	08/10/18 14:23	08/31/18 05:45	1
<b>Potassium-40</b>	<b>15.6</b>		2.09	2.63		0.318	pCi/g	08/10/18 14:23	08/31/18 05:45	1
Protactinium-231	0.409	U	1.44	1.44		2.06	pCi/g	08/10/18 14:23	08/31/18 05:45	1
<b>Radium-226</b>	<b>0.643</b>		0.144	0.159	0.700	0.0310	pCi/g	08/10/18 14:23	08/31/18 05:45	1
<b>Radium-228</b>	<b>0.581</b>		0.219	0.227		0.206	pCi/g	08/10/18 14:23	08/31/18 05:45	1
<b>Thallium-208</b>	<b>0.238</b>		0.113	0.116		0.0551	pCi/g	08/10/18 14:23	08/31/18 05:45	1
<b>Thorium-228</b>	<b>0.724</b>		0.119	0.152		0.0490	pCi/g	08/10/18 14:23	08/31/18 05:45	1
<b>Thorium-232</b>	<b>0.581</b>		0.219	0.227		0.206	pCi/g	08/10/18 14:23	08/31/18 05:45	1
Thorium-234	0.361	U	0.340	0.342		1.10	pCi/g	08/10/18 14:23	08/31/18 05:45	1
Uranium-235	-0.199	U	0.115	0.117		0.396	pCi/g	08/10/18 14:23	08/31/18 05:45	1
Uranium-238	0.361	U	0.340	0.342		1.10	pCi/g	08/10/18 14:23	08/31/18 05:45	1

**Client Sample ID: PE2-RSYB2-DC-S007**

Date Collected: 08/01/18 13:19

Date Received: 08/09/18 08:30

**Lab Sample ID: 160-30066-7**

Matrix: Solid

**Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)**

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
<b>Actinium 228</b>	<b>0.552</b>		0.180	0.188		0.123	pCi/g	08/10/18 14:23	08/31/18 06:22	1
Actinium-227	0.183	U	0.968	0.968		0.790	pCi/g	08/10/18 14:23	08/31/18 06:22	1
Bismuth-212	-0.267	U	0.890	0.891		0.711	pCi/g	08/10/18 14:23	08/31/18 06:22	1
<b>Bismuth-214</b>	<b>0.596</b>		0.163	0.174		0.0538	pCi/g	08/10/18 14:23	08/31/18 06:22	1
Cesium-137	-0.0493	U	0.0836	0.0837	0.0700	0.0652	pCi/g	08/10/18 14:23	08/31/18 06:22	1
<b>Cobalt-60</b>	<b>0.0564</b>		0.0334	0.0339	0.200	0.0122	pCi/g	08/10/18 14:23	08/31/18 06:22	1
<b>Lead-210</b>	<b>2.12</b>		2.08	2.09		1.24	pCi/g	08/10/18 14:23	08/31/18 06:22	1
<b>Lead-212</b>	<b>0.473</b>		0.0986	0.110		0.0472	pCi/g	08/10/18 14:23	08/31/18 06:22	1
<b>Lead-214</b>	<b>0.667</b>		0.135	0.151		0.0674	pCi/g	08/10/18 14:23	08/31/18 06:22	1
<b>Potassium-40</b>	<b>9.46</b>		1.41	1.71		0.123	pCi/g	08/10/18 14:23	08/31/18 06:22	1
Protactinium-231	0.000	U	0.936	0.936		2.61	pCi/g	08/10/18 14:23	08/31/18 06:22	1
<b>Radium-226</b>	<b>0.596</b>		0.163	0.174	0.700	0.0538	pCi/g	08/10/18 14:23	08/31/18 06:22	1
<b>Radium-228</b>	<b>0.552</b>		0.180	0.188		0.123	pCi/g	08/10/18 14:23	08/31/18 06:22	1
<b>Thallium-208</b>	<b>0.221</b>		0.0713	0.0748		0.0279	pCi/g	08/10/18 14:23	08/31/18 06:22	1
<b>Thorium-228</b>	<b>0.473</b>		0.0986	0.110		0.0472	pCi/g	08/10/18 14:23	08/31/18 06:22	1
<b>Thorium-232</b>	<b>0.552</b>		0.180	0.188		0.123	pCi/g	08/10/18 14:23	08/31/18 06:22	1
Thorium-234	-0.198	U	1.63	1.63		1.35	pCi/g	08/10/18 14:23	08/31/18 06:22	1
Uranium-235	-0.0634	U	0.146	0.146		0.632	pCi/g	08/10/18 14:23	08/31/18 06:22	1
Uranium-238	-0.198	U	1.63	1.63		1.35	pCi/g	08/10/18 14:23	08/31/18 06:22	1

# Client Sample Results

Client: Aptim Federal Services LLC

Project/Site: Hunters Point Naval Shipyard - Parcel E2

TestAmerica Job ID: 160-30066-2

**Client Sample ID: PE2-RSYB2-DC-S008**

Date Collected: 08/01/18 13:26

Date Received: 08/09/18 08:30

**Lab Sample ID: 160-30066-8**

Matrix: Solid

**Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)**

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
<b>Actinium 228</b>	<b>0.168</b>		0.172	0.173		0.111	pCi/g	08/10/18 14:23	08/31/18 06:22	1
Actinium-227	0.0835	U	0.192	0.192		0.379	pCi/g	08/10/18 14:23	08/31/18 06:22	1
Bismuth-212	-0.0134	U	0.957	0.957		0.238	pCi/g	08/10/18 14:23	08/31/18 06:22	1
<b>Bismuth-214</b>	<b>0.625</b>		0.135	0.150		0.0420	pCi/g	08/10/18 14:23	08/31/18 06:22	1
Cesium-137	-0.0417	U	0.0781	0.0782	0.0700	0.0588	pCi/g	08/10/18 14:23	08/31/18 06:22	1
Cobalt-60	-0.0134	U	0.0765	0.0765	0.200	0.0383	pCi/g	08/10/18 14:23	08/31/18 06:22	1
Lead-210	0.640	U	1.23	1.23		0.847	pCi/g	08/10/18 14:23	08/31/18 06:22	1
<b>Lead-212</b>	<b>0.164</b>		0.101	0.103		0.0745	pCi/g	08/10/18 14:23	08/31/18 06:22	1
<b>Lead-214</b>	<b>0.570</b>		0.140	0.152		0.0561	pCi/g	08/10/18 14:23	08/31/18 06:22	1
<b>Potassium-40</b>	<b>5.42</b>		1.57	1.67		0.609	pCi/g	08/10/18 14:23	08/31/18 06:22	1
Protactinium-231	0.529	U	1.54	1.54		1.69	pCi/g	08/10/18 14:23	08/31/18 06:22	1
<b>Radium-226</b>	<b>0.625</b>		0.135	0.150	0.700	0.0420	pCi/g	08/10/18 14:23	08/31/18 06:22	1
<b>Radium-228</b>	<b>0.168</b>		0.172	0.173		0.111	pCi/g	08/10/18 14:23	08/31/18 06:22	1
<b>Thallium-208</b>	<b>0.149</b>		0.0526	0.0548		0.0202	pCi/g	08/10/18 14:23	08/31/18 06:22	1
<b>Thorium-228</b>	<b>0.164</b>		0.101	0.103		0.0745	pCi/g	08/10/18 14:23	08/31/18 06:22	1
<b>Thorium-232</b>	<b>0.168</b>		0.172	0.173		0.111	pCi/g	08/10/18 14:23	08/31/18 06:22	1
<b>Thorium-234</b>	<b>1.14</b>		1.08	1.09		0.713	pCi/g	08/10/18 14:23	08/31/18 06:22	1
Uranium-235	0.145	U	0.271	0.272		0.267	pCi/g	08/10/18 14:23	08/31/18 06:22	1
Uranium-238	1.14		1.08	1.09		0.713	pCi/g	08/10/18 14:23	08/31/18 06:22	1

**Client Sample ID: PE2-RSYB2-DC-S009**

Date Collected: 08/01/18 13:33

Date Received: 08/09/18 08:30

**Lab Sample ID: 160-30066-9**

Matrix: Solid

**Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)**

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
<b>Actinium 228</b>	<b>0.320</b>		0.235	0.237		0.119	pCi/g	08/10/18 14:23	08/31/18 06:23	1
Actinium-227	-0.424	U	0.923	0.924		0.590	pCi/g	08/10/18 14:23	08/31/18 06:23	1
Bismuth-212	0.497	U	1.03	1.03		0.808	pCi/g	08/10/18 14:23	08/31/18 06:23	1
<b>Bismuth-214</b>	<b>0.521</b>		0.171	0.179		0.0633	pCi/g	08/10/18 14:23	08/31/18 06:23	1
Cesium-137	-0.0568	U	0.0928	0.0930	0.0700	0.0704	pCi/g	08/10/18 14:23	08/31/18 06:23	1
Cobalt-60	-0.00240	U	0.00900	0.00901	0.200	0.0513	pCi/g	08/10/18 14:23	08/31/18 06:23	1
Lead-210	-0.0579	U	1.87	1.87		1.54	pCi/g	08/10/18 14:23	08/31/18 06:23	1
<b>Lead-212</b>	<b>0.510</b>		0.107	0.126		0.0512	pCi/g	08/10/18 14:23	08/31/18 06:23	1
<b>Lead-214</b>	<b>0.617</b>		0.140	0.154		0.0568	pCi/g	08/10/18 14:23	08/31/18 06:23	1
<b>Potassium-40</b>	<b>12.5</b>		1.86	2.25		0.304	pCi/g	08/10/18 14:23	08/31/18 06:23	1
Protactinium-231	0.409	U	1.63	1.63		2.56	pCi/g	08/10/18 14:23	08/31/18 06:23	1
<b>Radium-226</b>	<b>0.521</b>		0.171	0.179	0.700	0.0633	pCi/g	08/10/18 14:23	08/31/18 06:23	1
<b>Radium-228</b>	<b>0.320</b>		0.235	0.237		0.119	pCi/g	08/10/18 14:23	08/31/18 06:23	1
<b>Thallium-208</b>	<b>0.177</b>		0.0783	0.0804		0.0349	pCi/g	08/10/18 14:23	08/31/18 06:23	1
<b>Thorium-228</b>	<b>0.510</b>		0.107	0.126		0.0512	pCi/g	08/10/18 14:23	08/31/18 06:23	1
<b>Thorium-232</b>	<b>0.320</b>		0.235	0.237		0.119	pCi/g	08/10/18 14:23	08/31/18 06:23	1
Thorium-234	0.138	U	1.73	1.73		1.42	pCi/g	08/10/18 14:23	08/31/18 06:23	1
Uranium-235	0.148	U	0.506	0.506		0.510	pCi/g	08/10/18 14:23	08/31/18 06:23	1
Uranium-238	0.138	U	1.73	1.73		1.42	pCi/g	08/10/18 14:23	08/31/18 06:23	1

# Client Sample Results

Client: Aptim Federal Services LLC

Project/Site: Hunters Point Naval Shipyard - Parcel E2

TestAmerica Job ID: 160-30066-2

**Client Sample ID: PE2-RSYB2-DC-S010****Lab Sample ID: 160-30066-10**

Date Collected: 08/01/18 13:40

Matrix: Solid

Date Received: 08/09/18 08:30

**Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)**

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
<b>Actinium 228</b>	<b>0.924</b>		0.198	0.220		0.0444	pCi/g	08/10/18 14:23	08/31/18 06:26	1
Actinium-227	0.0364	U	0.707	0.707		0.488	pCi/g	08/10/18 14:23	08/31/18 06:26	1
Bismuth-212	0.433	U	0.793	0.795		0.622	pCi/g	08/10/18 14:23	08/31/18 06:26	1
<b>Bismuth-214</b>	<b>0.744</b>		0.141	0.161		0.0465	pCi/g	08/10/18 14:23	08/31/18 06:26	1
Cesium-137	0.0224	U	0.0459	0.0460	0.0700	0.0355	pCi/g	08/10/18 14:23	08/31/18 06:26	1
Cobalt-60	-0.0183	U	0.0758	0.0758	0.200	0.0438	pCi/g	08/10/18 14:23	08/31/18 06:26	1
<b>Lead-210</b>	<b>1.14</b>		1.10	1.11		0.774	pCi/g	08/10/18 14:23	08/31/18 06:26	1
<b>Lead-212</b>	<b>0.634</b>		0.100	0.130		0.0472	pCi/g	08/10/18 14:23	08/31/18 06:26	1
<b>Lead-214</b>	<b>0.719</b>		0.148	0.165		0.0611	pCi/g	08/10/18 14:23	08/31/18 06:26	1
<b>Potassium-40</b>	<b>16.8</b>		1.69	2.41		0.255	pCi/g	08/10/18 14:23	08/31/18 06:26	1
Protactinium-231	0.432	U	2.82	2.82		2.31	pCi/g	08/10/18 14:23	08/31/18 06:26	1
<b>Radium-226</b>	<b>0.744</b>		0.141	0.161	0.700	0.0465	pCi/g	08/10/18 14:23	08/31/18 06:26	1
<b>Radium-228</b>	<b>0.924</b>		0.198	0.220		0.0444	pCi/g	08/10/18 14:23	08/31/18 06:26	1
<b>Thallium-208</b>	<b>0.321</b>		0.0708	0.0782		0.0238	pCi/g	08/10/18 14:23	08/31/18 06:26	1
<b>Thorium-228</b>	<b>0.634</b>		0.100	0.130		0.0472	pCi/g	08/10/18 14:23	08/31/18 06:26	1
<b>Thorium-232</b>	<b>0.924</b>		0.198	0.220		0.0444	pCi/g	08/10/18 14:23	08/31/18 06:26	1
<b>Thorium-234</b>	<b>1.57</b>		0.959	0.973		0.705	pCi/g	08/10/18 14:23	08/31/18 06:26	1
Uranium-235	-0.214	U	0.280	0.281		0.324	pCi/g	08/10/18 14:23	08/31/18 06:26	1
<b>Uranium-238</b>	<b>1.57</b>		0.959	0.973		0.705	pCi/g	08/10/18 14:23	08/31/18 06:26	1

**Client Sample ID: PE2-RSYB2-DC-S011****Lab Sample ID: 160-30066-11**

Date Collected: 08/01/18 13:47

Matrix: Solid

Date Received: 08/09/18 08:30

**Method: 905.0 - Total Beta Strontium (GFPC)**

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
<b>Total Beta Strontium</b>	<b>0.0964</b>		0.0704	0.0707	0.331	0.0496	pCi/g	08/16/18 12:28	09/05/18 05:45	1
<b>Carrier</b>	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Sr Carrier	80.7		40 - 110					08/16/18 12:28	09/05/18 05:45	1

**Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)**

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
<b>Actinium 228</b>	<b>0.945</b>		0.274	0.291		0.0743	pCi/g	08/10/18 14:23	08/31/18 06:22	1
Actinium-227	0.0687	U	0.184	0.184		0.942	pCi/g	08/10/18 14:23	08/31/18 06:22	1
Bismuth-212	0.626	U	1.13	1.13		0.881	pCi/g	08/10/18 14:23	08/31/18 06:22	1
<b>Bismuth-214</b>	<b>0.907</b>		0.205	0.225		0.0791	pCi/g	08/10/18 14:23	08/31/18 06:22	1
Cesium-137	-0.0591	U	0.0933	0.0935	0.0700	0.0724	pCi/g	08/10/18 14:23	08/31/18 06:22	1
Cobalt-60	-0.0842	U	0.102	0.103	0.200	0.0808	pCi/g	08/10/18 14:23	08/31/18 06:22	1
<b>Lead-210</b>	<b>1.80</b>		2.32	2.33		1.40	pCi/g	08/10/18 14:23	08/31/18 06:22	1
<b>Lead-212</b>	<b>0.884</b>		0.139	0.167		0.0651	pCi/g	08/10/18 14:23	08/31/18 06:22	1
<b>Lead-214</b>	<b>1.23</b>		0.201	0.237		0.0682	pCi/g	08/10/18 14:23	08/31/18 06:22	1
<b>Potassium-40</b>	<b>18.0</b>		2.13	2.80		0.395	pCi/g	08/10/18 14:23	08/31/18 06:22	1
Protactinium-231	0.000	U	0.879	0.879		3.39	pCi/g	08/10/18 14:23	08/31/18 06:22	1

# Client Sample Results

Client: Aptim Federal Services LLC

Project/Site: Hunters Point Naval Shipyard - Parcel E2

TestAmerica Job ID: 160-30066-2

**Client Sample ID: PE2-RSYB2-DC-S011****Lab Sample ID: 160-30066-11**

Date Collected: 08/01/18 13:47

Matrix: Solid

Date Received: 08/09/18 08:30

**Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)**

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Radium-226	0.907		0.205	0.225	0.700	0.0791	pCi/g	08/10/18 14:23	08/31/18 06:22	1
Radium-228	0.945		0.274	0.291		0.0743	pCi/g	08/10/18 14:23	08/31/18 06:22	1
Thallium-208	0.296		0.0828	0.0881		0.0300	pCi/g	08/10/18 14:23	08/31/18 06:22	1
Thorium-228	0.884		0.139	0.167		0.0651	pCi/g	08/10/18 14:23	08/31/18 06:22	1
<b>Thorium-232</b>	<b>0.945</b>		0.274	0.291		0.0743	pCi/g	08/10/18 14:23	08/31/18 06:22	1
Thorium-234	-0.198 U		2.02	2.02		1.67	pCi/g	08/10/18 14:23	08/31/18 06:22	1
Uranium-235	0.0710 U		0.127	0.128		0.442	pCi/g	08/10/18 14:23	08/31/18 06:22	1
Uranium-238	-0.198 U		2.02	2.02		1.67	pCi/g	08/10/18 14:23	08/31/18 06:22	1

**Client Sample ID: PE2-RSYB2-DC-S012****Lab Sample ID: 160-30066-12**

Date Collected: 08/01/18 13:54

Matrix: Solid

Date Received: 08/09/18 08:30

**Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)**

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
<b>Actinium 228</b>	<b>0.260</b>		0.132	0.134		0.0509	pCi/g	08/10/18 14:23	08/31/18 06:21	1
Actinium-227	-0.436 U		0.896	0.897		0.722	pCi/g	08/10/18 14:23	08/31/18 06:21	1
Bismuth-212	-0.00149 U		1.09	1.09		0.578	pCi/g	08/10/18 14:23	08/31/18 06:21	1
<b>Bismuth-214</b>	<b>0.591</b>		0.149	0.161		0.0525	pCi/g	08/10/18 14:23	08/31/18 06:21	1
Cesium-137	-0.0544 U		0.0890	0.0891	0.0700	0.0517	pCi/g	08/10/18 14:23	08/31/18 06:21	1
<b>Cobalt-60</b>	<b>0.0314</b>		0.0379	0.0380	0.200	0.0223	pCi/g	08/10/18 14:23	08/31/18 06:21	1
Lead-210	-0.492 U		1.04	1.04		1.40	pCi/g	08/10/18 14:23	08/31/18 06:21	1
<b>Lead-212</b>	<b>0.370</b>		0.0815	0.0945		0.0379	pCi/g	08/10/18 14:23	08/31/18 06:21	1
<b>Lead-214</b>	<b>0.458</b>		0.111	0.121		0.0365	pCi/g	08/10/18 14:23	08/31/18 06:21	1
<b>Potassium-40</b>	<b>6.99</b>		1.27	1.46		0.249	pCi/g	08/10/18 14:23	08/31/18 06:21	1
Protactinium-231	0.000 U		0.789	0.789		2.30	pCi/g	08/10/18 14:23	08/31/18 06:21	1
<b>Radium-226</b>	<b>0.591</b>		0.149	0.161	0.700	0.0525	pCi/g	08/10/18 14:23	08/31/18 06:21	1
Radium-228	0.260		0.132	0.134		0.0509	pCi/g	08/10/18 14:23	08/31/18 06:21	1
Thallium-208	0.174		0.0505	0.0537		0.0151	pCi/g	08/10/18 14:23	08/31/18 06:21	1
Thorium-228	0.370		0.0815	0.0945		0.0379	pCi/g	08/10/18 14:23	08/31/18 06:21	1
<b>Thorium-232</b>	<b>0.260</b>		0.132	0.134		0.0509	pCi/g	08/10/18 14:23	08/31/18 06:21	1
<b>Thorium-234</b>	<b>0.802</b>		0.483	0.491		0.668	pCi/g	08/10/18 14:23	08/31/18 06:21	1
Uranium-235	-0.229 U		0.228	0.229		0.422	pCi/g	08/10/18 14:23	08/31/18 06:21	1
<b>Uranium-238</b>	<b>0.802</b>		0.483	0.491		0.668	pCi/g	08/10/18 14:23	08/31/18 06:21	1

**Client Sample ID: PE2-RSYB2-DC-S013****Lab Sample ID: 160-30066-13**

Date Collected: 08/01/18 13:59

Matrix: Solid

Date Received: 08/09/18 08:30

**Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)**

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
<b>Actinium 228</b>	<b>0.513</b>		0.293	0.297		0.142	pCi/g	08/10/18 14:23	08/31/18 06:23	1
Actinium-227	-0.109 U		0.862	0.862		0.592	pCi/g	08/10/18 14:23	08/31/18 06:23	1
Bismuth-212	0.442 U		0.843	0.844		0.637	pCi/g	08/10/18 14:23	08/31/18 06:23	1

# Client Sample Results

Client: Aptim Federal Services LLC

Project/Site: Hunters Point Naval Shipyard - Parcel E2

TestAmerica Job ID: 160-30066-2

**Client Sample ID: PE2-RSYB2-DC-S013****Lab Sample ID: 160-30066-13**

Date Collected: 08/01/18 13:59

Matrix: Solid

Date Received: 08/09/18 08:30

**Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)**

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Bismuth-214	0.711		0.196	0.210		0.0675	pCi/g	08/10/18 14:23	08/31/18 06:23	1
Cesium-137	0.0124	U	0.0994	0.0994	0.0700	0.0807	pCi/g	08/10/18 14:23	08/31/18 06:23	1
Cobalt-60	0.0371	U	0.0902	0.0903	0.200	0.0428	pCi/g	08/10/18 14:23	08/31/18 06:23	1
Lead-210	0.844	U	1.79	1.79		1.23	pCi/g	08/10/18 14:23	08/31/18 06:23	1
<b>Lead-212</b>	<b>0.580</b>		0.118	0.140		0.0498	pCi/g	08/10/18 14:23	08/31/18 06:23	1
<b>Lead-214</b>	<b>0.921</b>		0.174	0.198		0.0643	pCi/g	08/10/18 14:23	08/31/18 06:23	1
<b>Potassium-40</b>	<b>12.4</b>		2.05	2.41		0.380	pCi/g	08/10/18 14:23	08/31/18 06:23	1
Protactinium-231	0.463	U	1.87	1.87		2.94	pCi/g	08/10/18 14:23	08/31/18 06:23	1
<b>Radium-226</b>	<b>0.711</b>		0.196	0.210	0.700	0.0675	pCi/g	08/10/18 14:23	08/31/18 06:23	1
<b>Radium-228</b>	<b>0.513</b>		0.293	0.297		0.142	pCi/g	08/10/18 14:23	08/31/18 06:23	1
<b>Thallium-208</b>	<b>0.185</b>		0.0659	0.0686		0.0179	pCi/g	08/10/18 14:23	08/31/18 06:23	1
<b>Thorium-228</b>	<b>0.580</b>		0.118	0.140		0.0498	pCi/g	08/10/18 14:23	08/31/18 06:23	1
<b>Thorium-232</b>	<b>0.513</b>		0.293	0.297		0.142	pCi/g	08/10/18 14:23	08/31/18 06:23	1
Thorium-234	0.306	U	1.44	1.45		1.17	pCi/g	08/10/18 14:23	08/31/18 06:23	1
Uranium-235	0.0644	U	0.134	0.134		0.341	pCi/g	08/10/18 14:23	08/31/18 06:23	1
Uranium-238	0.306	U	1.44	1.45		1.17	pCi/g	08/10/18 14:23	08/31/18 06:23	1

**Client Sample ID: PE2-RSYB2-DC-S014****Lab Sample ID: 160-30066-14**

Date Collected: 08/01/18 14:06

Matrix: Solid

Date Received: 08/09/18 08:30

**Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)**

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
Actinium 228	0.373		0.148	0.153		0.0879	pCi/g	08/10/18 14:23	08/31/18 07:01	1
Actinium-227	-0.218	U	0.512	0.512		0.541	pCi/g	08/10/18 14:23	08/31/18 07:01	1
Bismuth-212	0.236	U	0.572	0.573		0.449	pCi/g	08/10/18 14:23	08/31/18 07:01	1
<b>Bismuth-214</b>	<b>0.489</b>		0.112	0.123		0.0392	pCi/g	08/10/18 14:23	08/31/18 07:01	1
Cesium-137	0.00173	U	0.0414	0.0414	0.0700	0.0339	pCi/g	08/10/18 14:23	08/31/18 07:01	1
Cobalt-60	-0.00763	U	0.0746	0.0746	0.200	0.0367	pCi/g	08/10/18 14:23	08/31/18 07:01	1
<b>Lead-210</b>	<b>1.49</b>		1.08	1.09		0.801	pCi/g	08/10/18 14:23	08/31/18 07:01	1
<b>Lead-212</b>	<b>0.419</b>		0.0739	0.0917		0.0294	pCi/g	08/10/18 14:23	08/31/18 07:01	1
<b>Lead-214</b>	<b>0.553</b>		0.101	0.116		0.0408	pCi/g	08/10/18 14:23	08/31/18 07:01	1
<b>Potassium-40</b>	<b>8.28</b>		1.17	1.44		0.239	pCi/g	08/10/18 14:23	08/31/18 07:01	1
Protactinium-231	-0.754	U	2.38	2.38		1.94	pCi/g	08/10/18 14:23	08/31/18 07:01	1
<b>Radium-226</b>	<b>0.489</b>		0.112	0.123	0.700	0.0392	pCi/g	08/10/18 14:23	08/31/18 07:01	1
<b>Radium-228</b>	<b>0.373</b>		0.148	0.153		0.0879	pCi/g	08/10/18 14:23	08/31/18 07:01	1
<b>Thallium-208</b>	<b>0.161</b>		0.0415	0.0447		0.0107	pCi/g	08/10/18 14:23	08/31/18 07:01	1
<b>Thorium-228</b>	<b>0.419</b>		0.0739	0.0917		0.0294	pCi/g	08/10/18 14:23	08/31/18 07:01	1
<b>Thorium-232</b>	<b>0.373</b>		0.148	0.153		0.0879	pCi/g	08/10/18 14:23	08/31/18 07:01	1
Thorium-234	0.509	U	1.10	1.10		0.884	pCi/g	08/10/18 14:23	08/31/18 07:01	1
Uranium-235	0.0912	U	0.444	0.444		0.363	pCi/g	08/10/18 14:23	08/31/18 07:01	1
Uranium-238	0.509	U	1.10	1.10		0.884	pCi/g	08/10/18 14:23	08/31/18 07:01	1

# Client Sample Results

Client: Aptim Federal Services LLC

Project/Site: Hunters Point Naval Shipyard - Parcel E2

TestAmerica Job ID: 160-30066-2

**Client Sample ID: PE2-RSYB2-DC-S015****Lab Sample ID: 160-30066-15**

Date Collected: 08/01/18 14:13

Matrix: Solid

Date Received: 08/09/18 08:30

**Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)**

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
<b>Actinium 228</b>	<b>0.318</b>		0.251	0.253		0.115	pCi/g	08/10/18 14:23	08/31/18 07:03	1
Actinium-227	-0.341	U	0.939	0.940		0.761	pCi/g	08/10/18 14:23	08/31/18 07:03	1
Bismuth-212	0.197	U	0.720	0.720		0.574	pCi/g	08/10/18 14:23	08/31/18 07:03	1
<b>Bismuth-214</b>	<b>0.560</b>		0.172	0.181		0.0612	pCi/g	08/10/18 14:23	08/31/18 07:03	1
Cesium-137	0.0184	U	0.0693	0.0694	0.0700	0.0556	pCi/g	08/10/18 14:23	08/31/18 07:03	1
Cobalt-60	-0.00163	U	0.0775	0.0775	0.200	0.0384	pCi/g	08/10/18 14:23	08/31/18 07:03	1
<b>Lead-210</b>	<b>1.65</b>		1.37	1.38		1.02	pCi/g	08/10/18 14:23	08/31/18 07:03	1
<b>Lead-212</b>	<b>0.355</b>		0.0930	0.100		0.0530	pCi/g	08/10/18 14:23	08/31/18 07:03	1
<b>Lead-214</b>	<b>0.649</b>		0.140	0.154		0.0685	pCi/g	08/10/18 14:23	08/31/18 07:03	1
<b>Potassium-40</b>	<b>9.51</b>		1.37	1.67		0.115	pCi/g	08/10/18 14:23	08/31/18 07:03	1
Protactinium-231	0.679	U	2.17	2.17		2.37	pCi/g	08/10/18 14:23	08/31/18 07:03	1
<b>Radium-226</b>	<b>0.560</b>		0.172	0.181	0.700	0.0612	pCi/g	08/10/18 14:23	08/31/18 07:03	1
<b>Radium-228</b>	<b>0.318</b>		0.251	0.253		0.115	pCi/g	08/10/18 14:23	08/31/18 07:03	1
<b>Thallium-208</b>	<b>0.186</b>		0.0627	0.0655		0.0233	pCi/g	08/10/18 14:23	08/31/18 07:03	1
<b>Thorium-228</b>	<b>0.355</b>		0.0930	0.100		0.0530	pCi/g	08/10/18 14:23	08/31/18 07:03	1
<b>Thorium-232</b>	<b>0.318</b>		0.251	0.253		0.115	pCi/g	08/10/18 14:23	08/31/18 07:03	1
Thorium-234	0.423	U	0.392	0.395		1.21	pCi/g	08/10/18 14:23	08/31/18 07:03	1
Uranium-235	0.000	U	0.208	0.208		0.431	pCi/g	08/10/18 14:23	08/31/18 07:03	1
Uranium-238	0.423	U	0.392	0.395		1.21	pCi/g	08/10/18 14:23	08/31/18 07:03	1

**Client Sample ID: PE2-RSYB2-DC-S016****Lab Sample ID: 160-30066-16**

Date Collected: 08/01/18 14:18

Matrix: Solid

Date Received: 08/09/18 08:30

**Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)**

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
<b>Actinium 228</b>	<b>0.398</b>		0.160	0.165		0.0926	pCi/g	08/10/18 14:23	08/31/18 07:04	1
Actinium-227	0.193	U	0.461	0.461		0.307	pCi/g	08/10/18 14:23	08/31/18 07:04	1
Bismuth-212	0.0140	U	0.731	0.731		0.600	pCi/g	08/10/18 14:23	08/31/18 07:04	1
<b>Bismuth-214</b>	<b>0.577</b>		0.150	0.161		0.0517	pCi/g	08/10/18 14:23	08/31/18 07:04	1
Cesium-137	-0.0244	U	0.0818	0.0819	0.0700	0.0430	pCi/g	08/10/18 14:23	08/31/18 07:04	1
Cobalt-60	0.0189	U	0.0576	0.0576	0.200	0.0277	pCi/g	08/10/18 14:23	08/31/18 07:04	1
Lead-210	0.551	U	1.18	1.18		0.818	pCi/g	08/10/18 14:23	08/31/18 07:04	1
<b>Lead-212</b>	<b>0.250</b>		0.114	0.118		0.0817	pCi/g	08/10/18 14:23	08/31/18 07:04	1
<b>Lead-214</b>	<b>0.472</b>		0.106	0.117		0.0610	pCi/g	08/10/18 14:23	08/31/18 07:04	1
<b>Potassium-40</b>	<b>6.84</b>		1.23	1.41		0.235	pCi/g	08/10/18 14:23	08/31/18 07:04	1
Protactinium-231	0.0000002	U	2.23	2.23		1.83	pCi/g	08/10/18 14:23	08/31/18 07:04	1
		08								
<b>Radium-226</b>	<b>0.577</b>		0.150	0.161	0.700	0.0517	pCi/g	08/10/18 14:23	08/31/18 07:04	1
<b>Radium-228</b>	<b>0.398</b>		0.160	0.165		0.0926	pCi/g	08/10/18 14:23	08/31/18 07:04	1
<b>Thallium-208</b>	<b>0.0937</b>		0.0483	0.0493		0.0233	pCi/g	08/10/18 14:23	08/31/18 07:04	1
<b>Thorium-228</b>	<b>0.250</b>		0.114	0.118		0.0817	pCi/g	08/10/18 14:23	08/31/18 07:04	1
<b>Thorium-232</b>	<b>0.398</b>		0.160	0.165		0.0926	pCi/g	08/10/18 14:23	08/31/18 07:04	1
Thorium-234	0.145	U	1.16	1.16		0.809	pCi/g	08/10/18 14:23	08/31/18 07:04	1
Uranium-235	0.0972	U	0.267	0.267		0.263	pCi/g	08/10/18 14:23	08/31/18 07:04	1
Uranium-238	0.145	U	1.16	1.16		0.809	pCi/g	08/10/18 14:23	08/31/18 07:04	1

# Client Sample Results

Client: Aptim Federal Services LLC

Project/Site: Hunters Point Naval Shipyard - Parcel E2

TestAmerica Job ID: 160-30066-2

**Client Sample ID: PE2-RSYB2-DC-S017****Lab Sample ID: 160-30066-17**

Date Collected: 08/01/18 14:24

Matrix: Solid

Date Received: 08/09/18 08:30

**Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)**

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
<b>Actinium 228</b>	<b>0.444</b>		0.152	0.159		0.157	pCi/g	08/10/18 14:23	08/31/18 07:06	1
Actinium-227	-0.0399	U	0.0611	0.0613		0.508	pCi/g	08/10/18 14:23	08/31/18 07:06	1
Bismuth-212	0.292	U	0.587	0.588		0.442	pCi/g	08/10/18 14:23	08/31/18 07:06	1
<b>Bismuth-214</b>	<b>0.415</b>		0.127	0.134		0.0483	pCi/g	08/10/18 14:23	08/31/18 07:06	1
Cesium-137	0.0376	U	0.0821	0.0821	0.0700	0.0645	pCi/g	08/10/18 14:23	08/31/18 07:06	1
Cobalt-60	0.0114	U	0.0677	0.0677	0.200	0.0350	pCi/g	08/10/18 14:23	08/31/18 07:06	1
Lead-210	-0.0697	U	1.71	1.71		1.40	pCi/g	08/10/18 14:23	08/31/18 07:06	1
<b>Lead-212</b>	<b>0.340</b>		0.0888	0.0991		0.0463	pCi/g	08/10/18 14:23	08/31/18 07:06	1
<b>Lead-214</b>	<b>0.526</b>		0.120	0.131		0.0578	pCi/g	08/10/18 14:23	08/31/18 07:06	1
<b>Potassium-40</b>	<b>6.08</b>		1.45	1.58		0.444	pCi/g	08/10/18 14:23	08/31/18 07:06	1
<b>Protactinium-231</b>	<b>1.03</b>		0.617	0.627		0.534	pCi/g	08/10/18 14:23	08/31/18 07:06	1
<b>Radium-226</b>	<b>0.415</b>		0.127	0.134	0.700	0.0483	pCi/g	08/10/18 14:23	08/31/18 07:06	1
<b>Radium-228</b>	<b>0.444</b>		0.152	0.159		0.157	pCi/g	08/10/18 14:23	08/31/18 07:06	1
<b>Thallium-208</b>	<b>0.153</b>		0.0579	0.0600		0.0216	pCi/g	08/10/18 14:23	08/31/18 07:06	1
<b>Thorium-228</b>	<b>0.340</b>		0.0888	0.0991		0.0463	pCi/g	08/10/18 14:23	08/31/18 07:06	1
<b>Thorium-232</b>	<b>0.444</b>		0.152	0.159		0.157	pCi/g	08/10/18 14:23	08/31/18 07:06	1
<b>Thorium-234</b>	<b>0.919</b>		1.00	1.01		0.654	pCi/g	08/10/18 14:23	08/31/18 07:06	1
Uranium-235	0.0599	U	0.0664	0.0667		0.414	pCi/g	08/10/18 14:23	08/31/18 07:06	1
<b>Uranium-238</b>	<b>0.919</b>		1.00	1.01		0.654	pCi/g	08/10/18 14:23	08/31/18 07:06	1

**Client Sample ID: PE2-RSYB2-DC-S018****Lab Sample ID: 160-30066-18**

Date Collected: 08/01/18 14:30

Matrix: Solid

Date Received: 08/09/18 08:30

**Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)**

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
<b>Actinium 228</b>	<b>0.978</b>		0.223	0.244		0.0745	pCi/g	08/10/18 14:23	08/31/18 07:03	1
Actinium-227	0.0786	U	0.392	0.392		0.834	pCi/g	08/10/18 14:23	08/31/18 07:03	1
Bismuth-212	-0.0314	U	1.06	1.06		0.737	pCi/g	08/10/18 14:23	08/31/18 07:03	1
<b>Bismuth-214</b>	<b>0.529</b>		0.149	0.158		0.0588	pCi/g	08/10/18 14:23	08/31/18 07:03	1
Cesium-137	0.0175	U	0.0676	0.0676	0.0700	0.0539	pCi/g	08/10/18 14:23	08/31/18 07:03	1
Cobalt-60	-0.0128	U	0.114	0.114	0.200	0.0564	pCi/g	08/10/18 14:23	08/31/18 07:03	1
<b>Lead-210</b>	<b>1.61</b>		1.74	1.75		1.16	pCi/g	08/10/18 14:23	08/31/18 07:03	1
<b>Lead-212</b>	<b>0.643</b>		0.121	0.138		0.0600	pCi/g	08/10/18 14:23	08/31/18 07:03	1
<b>Lead-214</b>	<b>0.621</b>		0.163	0.175		0.0785	pCi/g	08/10/18 14:23	08/31/18 07:03	1
<b>Potassium-40</b>	<b>13.3</b>		1.93	2.36		0.489	pCi/g	08/10/18 14:23	08/31/18 07:03	1
Protactinium-231	-0.917	U	3.65	3.65		2.98	pCi/g	08/10/18 14:23	08/31/18 07:03	1
<b>Radium-226</b>	<b>0.529</b>		0.149	0.158	0.700	0.0588	pCi/g	08/10/18 14:23	08/31/18 07:03	1
<b>Radium-228</b>	<b>0.978</b>		0.223	0.244		0.0745	pCi/g	08/10/18 14:23	08/31/18 07:03	1
<b>Thallium-208</b>	<b>0.254</b>		0.0753	0.0796		0.0282	pCi/g	08/10/18 14:23	08/31/18 07:03	1
<b>Thorium-228</b>	<b>0.643</b>		0.121	0.138		0.0600	pCi/g	08/10/18 14:23	08/31/18 07:03	1
<b>Thorium-232</b>	<b>0.978</b>		0.223	0.244		0.0745	pCi/g	08/10/18 14:23	08/31/18 07:03	1
Thorium-234	-0.716	U	1.30	1.30		1.67	pCi/g	08/10/18 14:23	08/31/18 07:03	1
Uranium-235	0.141	U	0.295	0.295		0.277	pCi/g	08/10/18 14:23	08/31/18 07:03	1
Uranium-238	-0.716	U	1.30	1.30		1.67	pCi/g	08/10/18 14:23	08/31/18 07:03	1

# QC Sample Results

Client: Aptim Federal Services LLC

Project/Site: Hunters Point Naval Shipyard - Parcel E2

TestAmerica Job ID: 160-30066-2

## Method: 905.0 - Total Beta Strontium (GFPC)

Lab Sample ID: MB 160-382925/11-A

Matrix: Solid

Analysis Batch: 387161

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 382925

Analyte	MB MB		Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
	Result	Qualifier								
Total Beta Strontium	-0.01525	U	0.0722	0.0722	0.331	0.0607	pCi/g	08/16/18 12:28	09/05/18 05:46	1
<b>Carrier</b>										
Sr Carrier	70.7			40 - 110				Prepared	Analyzed	Dil Fac
								08/16/18 12:28	09/05/18 05:46	1

Lab Sample ID: LCS 160-382925/1-A

Matrix: Solid

Analysis Batch: 387161

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 382925

Analyte	Spike		LCS Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	LOQ	DLC	Unit	%Rec.	Limits
	Added	Result									
Total Beta Strontium		8.20	8.112			0.699	0.331	0.0764	pCi/g	99	75 - 125
<b>Carrier</b>											
Sr Carrier	55.1			40 - 110							

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Lab Sample ID: MB 160-381619/1-A

Matrix: Solid

Analysis Batch: 386482

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 381619

Analyte	MB MB		Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
	Result	Qualifier								
Actinium 228	0.0000	U	0.0251	0.0251		0.0292	pCi/g	08/10/18 14:23	08/31/18 05:42	1
Actinium-227	-0.2462	U	0.467	0.468		0.413	pCi/g	08/10/18 14:23	08/31/18 05:42	1
Bismuth-212	0.0000	U	0.0810	0.0810		0.270	pCi/g	08/10/18 14:23	08/31/18 05:42	1
Bismuth-214	-0.1338	U	0.0994	0.100		0.184	pCi/g	08/10/18 14:23	08/31/18 05:42	1
Cesium-137	0.02254	U	0.0568	0.0569	0.0700	0.0446	pCi/g	08/10/18 14:23	08/31/18 05:42	1
Cobalt-60	-0.008186	U	0.0563	0.0563	0.200	0.0272	pCi/g	08/10/18 14:23	08/31/18 05:42	1
Lead-210	0.3690	U	0.981	0.982		0.777	pCi/g	08/10/18 14:23	08/31/18 05:42	1
Lead-212	-0.02824	U	0.0508	0.0509		0.0556	pCi/g	08/10/18 14:23	08/31/18 05:42	1
Lead-214	-0.06025	U	0.118	0.118		0.0746	pCi/g	08/10/18 14:23	08/31/18 05:42	1
Potassium-40	-0.3528	U	0.698	0.699		0.308	pCi/g	08/10/18 14:23	08/31/18 05:42	1
Protactinium-231	0.2596	U	0.915	0.916		1.44	pCi/g	08/10/18 14:23	08/31/18 05:42	1
Radium-226	-0.1338	U	0.0994	0.100	0.700	0.184	pCi/g	08/10/18 14:23	08/31/18 05:42	1
Radium-228	0.0000	U	0.0251	0.0251		0.0292	pCi/g	08/10/18 14:23	08/31/18 05:42	1
Thallium-208	0.001984	U	0.0113	0.0113		0.0258	pCi/g	08/10/18 14:23	08/31/18 05:42	1
Thorium-228	-0.02824	U	0.0508	0.0509		0.0556	pCi/g	08/10/18 14:23	08/31/18 05:42	1
Thorium-232	0.0000	U	0.0251	0.0251		0.0292	pCi/g	08/10/18 14:23	08/31/18 05:42	1
Thorium-234	0.06679	U	0.299	0.299		0.596	pCi/g	08/10/18 14:23	08/31/18 05:42	1
Uranium-235	0.1080	U	0.222	0.222		0.218	pCi/g	08/10/18 14:23	08/31/18 05:42	1
Uranium-238	0.06679	U	0.299	0.299		0.596	pCi/g	08/10/18 14:23	08/31/18 05:42	1

# QC Sample Results

Client: Aptim Federal Services LLC

Project/Site: Hunters Point Naval Shipyard - Parcel E2

TestAmerica Job ID: 160-30066-2

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Lab Sample ID: LCS 160-381619/2-A

Matrix: Solid

Analysis Batch: 386481

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 381619

Analyte	Spike Added	LCS		Uncert. (2σ+/-)	Total		%Rec	%Rec. Limits
		Result	Qual		LOQ	DLC		
Americium-241	96.8	96.97		11.4		0.549	pCi/g	100 87 - 116
Cesium-137	28.2	30.37		3.19	0.0700	0.133	pCi/g	108 87 - 120
Cobalt-60	12.8	13.49		1.41	0.200	0.0780	pCi/g	105 87 - 115

Lab Sample ID: 160-30066-1 DU

Matrix: Solid

Analysis Batch: 386482

Client Sample ID: PE2-RSYB2-DC-S001

Prep Type: Total/NA

Prep Batch: 381619

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total		RER	RER Limit
					Uncert. (2σ+/-)	LOQ	DLC	Unit
Actinium 228	0.680		0.7899		0.161		0.0475	pCi/g
Actinium-227	-0.0435	U	-0.1774	U	0.605		0.589	pCi/g
Bismuth-212	0.384	U	0.0000	U	0.479		0.579	pCi/g
Bismuth-214	0.616		0.5763		0.154		0.0524	pCi/g
Cesium-137	-0.00271	U	0.002837	U	0.0556	0.0700	0.0456	pCi/g
Cobalt-60	-0.00842	U	0.04643		0.0262	0.200	0.00832	pCi/g
Lead-210	1.15		-0.7815	U	1.28		1.32	pCi/g
Lead-212	0.507		0.5752		0.114		0.0387	pCi/g
Lead-214	0.612		0.6268		0.157		0.0570	pCi/g
Potassium-40	13.6		11.93		1.81		0.224	pCi/g
Protactinium-231	-0.749	U	0.5360	U	1.53		1.67	pCi/g
Radium-226	0.616		0.5763		0.154	0.700	0.0524	pCi/g
Radium-228	0.680		0.7899		0.161		0.0475	pCi/g
Thallium-208	0.225		0.1780		0.0566		0.0203	pCi/g
Thorium-228	0.507		0.5752		0.114		0.0387	pCi/g
Thorium-232	0.680		0.7899		0.161		0.0475	pCi/g
Thorium-234	0.224	U	0.4577	U	0.550		1.01	pCi/g
Uranium-235	0.198	U	0.01136	U	0.174		0.361	pCi/g
Uranium-238	0.224	U	0.4577	U	0.550		1.01	pCi/g

# QC Association Summary

Client: Aptim Federal Services LLC

Project/Site: Hunters Point Naval Shipyard - Parcel E2

TestAmerica Job ID: 160-30066-2

**Rad****Leach Batch: 381443**

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-30066-1	PE2-RSYB2-DC-S001	Total/NA	Solid	Dry and Grind	5
160-30066-2	PE2-RSYB2-DC-S002	Total/NA	Solid	Dry and Grind	5
160-30066-3	PE2-RSYB2-DC-S003	Total/NA	Solid	Dry and Grind	5
160-30066-4	PE2-RSYB2-DC-S004	Total/NA	Solid	Dry and Grind	5
160-30066-5	PE2-RSYB2-DC-S005	Total/NA	Solid	Dry and Grind	5
160-30066-6	PE2-RSYB2-DC-S006	Total/NA	Solid	Dry and Grind	5
160-30066-7	PE2-RSYB2-DC-S007	Total/NA	Solid	Dry and Grind	5
160-30066-8	PE2-RSYB2-DC-S008	Total/NA	Solid	Dry and Grind	5
160-30066-9	PE2-RSYB2-DC-S009	Total/NA	Solid	Dry and Grind	5
160-30066-10	PE2-RSYB2-DC-S010	Total/NA	Solid	Dry and Grind	5
160-30066-11	PE2-RSYB2-DC-S011	Total/NA	Solid	Dry and Grind	5
160-30066-12	PE2-RSYB2-DC-S012	Total/NA	Solid	Dry and Grind	5
160-30066-13	PE2-RSYB2-DC-S013	Total/NA	Solid	Dry and Grind	5
160-30066-14	PE2-RSYB2-DC-S014	Total/NA	Solid	Dry and Grind	5
160-30066-15	PE2-RSYB2-DC-S015	Total/NA	Solid	Dry and Grind	5
160-30066-16	PE2-RSYB2-DC-S016	Total/NA	Solid	Dry and Grind	5
160-30066-17	PE2-RSYB2-DC-S017	Total/NA	Solid	Dry and Grind	5
160-30066-18	PE2-RSYB2-DC-S018	Total/NA	Solid	Dry and Grind	5
160-30066-1 DU	PE2-RSYB2-DC-S001	Total/NA	Solid	Dry and Grind	5

**Prep Batch: 381619**

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-30066-1	PE2-RSYB2-DC-S001	Total/NA	Solid	Fill_Geo-21	381443
160-30066-2	PE2-RSYB2-DC-S002	Total/NA	Solid	Fill_Geo-21	381443
160-30066-3	PE2-RSYB2-DC-S003	Total/NA	Solid	Fill_Geo-21	381443
160-30066-4	PE2-RSYB2-DC-S004	Total/NA	Solid	Fill_Geo-21	381443
160-30066-5	PE2-RSYB2-DC-S005	Total/NA	Solid	Fill_Geo-21	381443
160-30066-6	PE2-RSYB2-DC-S006	Total/NA	Solid	Fill_Geo-21	381443
160-30066-7	PE2-RSYB2-DC-S007	Total/NA	Solid	Fill_Geo-21	381443
160-30066-8	PE2-RSYB2-DC-S008	Total/NA	Solid	Fill_Geo-21	381443
160-30066-9	PE2-RSYB2-DC-S009	Total/NA	Solid	Fill_Geo-21	381443
160-30066-10	PE2-RSYB2-DC-S010	Total/NA	Solid	Fill_Geo-21	381443
160-30066-11	PE2-RSYB2-DC-S011	Total/NA	Solid	Fill_Geo-21	381443
160-30066-12	PE2-RSYB2-DC-S012	Total/NA	Solid	Fill_Geo-21	381443
160-30066-13	PE2-RSYB2-DC-S013	Total/NA	Solid	Fill_Geo-21	381443
160-30066-14	PE2-RSYB2-DC-S014	Total/NA	Solid	Fill_Geo-21	381443
160-30066-15	PE2-RSYB2-DC-S015	Total/NA	Solid	Fill_Geo-21	381443
160-30066-16	PE2-RSYB2-DC-S016	Total/NA	Solid	Fill_Geo-21	381443
160-30066-17	PE2-RSYB2-DC-S017	Total/NA	Solid	Fill_Geo-21	381443
160-30066-18	PE2-RSYB2-DC-S018	Total/NA	Solid	Fill_Geo-21	381443
MB 160-381619/1-A	Method Blank	Total/NA	Solid	Fill_Geo-21	
LCS 160-381619/2-A	Lab Control Sample	Total/NA	Solid	Fill_Geo-21	
160-30066-1 DU	PE2-RSYB2-DC-S001	Total/NA	Solid	Fill_Geo-21	381443

**Prep Batch: 382925**

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-30066-1	PE2-RSYB2-DC-S001	Total/NA	Solid	DPS-0	381443
160-30066-11	PE2-RSYB2-DC-S011	Total/NA	Solid	DPS-0	381443
MB 160-382925/11-A	Method Blank	Total/NA	Solid	DPS-0	
LCS 160-382925/1-A	Lab Control Sample	Total/NA	Solid	DPS-0	

## Tracer/Carrier Summary

Client: Aptim Federal Services LLC

Project/Site: Hunters Point Naval Shipyard - Parcel E2

TestAmerica Job ID: 160-30066-2

**Method: 905.0 - Total Beta Strontium (GFPC)****Matrix: Solid****Prep Type: Total/NA****Percent Yield (Acceptance Limits)**

<b>Lab Sample ID</b>	<b>Client Sample ID</b>	<b>Sr Carrier (40-110)</b>
160-30066-1	PE2-RSYB2-DC-S001	80.3
160-30066-11	PE2-RSYB2-DC-S011	80.7
LCS 160-382925/1-A	Lab Control Sample	55.1
MB 160-382925/11-A	Method Blank	70.7

**Tracer/Carrier Legend**

Sr Carrier = Sr Carrier

1

2

3

4

5

6

7

8

9

10

11

12

# TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

## ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica St. Louis  
13715 Rider Trail North  
Earth City, MO 63045  
Tel: (314)298-8566

TestAmerica Job ID: 160-30103-2

Client Project/Site: Hunters Point Naval Shipyard - Parcel E2

For:

Aptim Federal Services LLC  
4005 Port Chicago Hwy, Suite 200  
Concord, California 94520

Attn: Eddie Kalombo

*Rhonda Ridenhower*

Authorized for release by:

9/6/2018 9:30:32 AM

Rhonda Ridenhower, Manager of Project Management  
(314)298-8566

[rhonda.ridenhower@testamericainc.com](mailto:rhonda.ridenhower@testamericainc.com)

### LINKS

Review your project  
results through

**TotalAccess**

Have a Question?

Ask  
The  
Expert

Visit us at:

[www.testamericainc.com](http://www.testamericainc.com)

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

# Table of Contents

Cover Page .....	1
Table of Contents .....	2
Case Narrative .....	3
Chain of Custody .....	5
Receipt Checklists .....	6
Definitions/Glossary .....	7
Method Summary .....	8
Sample Summary .....	9
Client Sample Results .....	10
QC Sample Results .....	14
QC Association Summary .....	16

## Case Narrative

Client: Aptim Federal Services LLC

Project/Site: Hunters Point Naval Shipyard - Parcel E2

TestAmerica Job ID: 160-30103-2

**Job ID: 160-30103-2**

**Laboratory: TestAmerica St. Louis**

**Narrative**

### CASE NARRATIVE

**Client: Aptim Federal Services LLC**

**Project: Hunters Point Naval Shipyard - Parcel E2**

**Report Number: 160-30103-2**

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

TestAmerica St. Louis attests to the validity of the laboratory data generated by TestAmerica facilities reported herein. All analyses performed by TestAmerica facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the application methods. TestAmerica's operations groups have reviewed the data for compliance with the laboratory QA/QC plan, and data have been found to be compliant with laboratory protocols unless otherwise noted below.

The test results in this report meet all NELAP requirements for parameters for which accreditation is required or available. Any exceptions to NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

All solid sample results for Chemistry analyses are reported on an "as received" basis unless otherwise indicated by the presence of a % solids value in the method header. All soil/sediment sample results for radiochemistry analyses are based upon sample as dried and disaggregated with the exception of tritium, carbon-14, and iodine-129 by gamma spectroscopy unless requested as wet weight by the client."

Any minimum detectable concentration (MDC), critical value (DLC), or Safe Drinking Water Act detection limit (SDWA DL) is sample-specific unless otherwise stated elsewhere in this narrative.

Reference the chain of custody and condition upon receipt report for any variations on receipt conditions and temperature of samples on receipt.

Manual Integrations were performed only when necessary and are in compliance with the laboratory's standard operating procedure. Detailed information can be found in the raw data section of the level IV report.

The following clean-up methods for Organic analyses may have been used on the samples in this data set. Specific methods employed are documented on the batch extraction logs:

Method 3600C: Cleanup

Method 3620C: Florisil Cleanup

Method 3630C: Silica Gel Cleanup

Method 3640A: Gel-Permeation Cleanup

Method 3650B: Acid-Base Partition Cleanup

Method 3660B: Sulfur Cleanup

## Case Narrative

Client: Aptim Federal Services LLC

Project/Site: Hunters Point Naval Shipyard - Parcel E2

TestAmerica Job ID: 160-30103-2

### **Job ID: 160-30103-2 (Continued)**

#### **Laboratory: TestAmerica St. Louis (Continued)**

Method 3665A: Sulfuric Acid/Permanganate Cleanup

This laboratory report is confidential and is intended for the sole use of TestAmerica and its client.

#### **RECEIPT**

The samples were received on 08/10/2018; the samples arrived in good condition, properly preserved. The temperature of the coolers at receipt was 20.0 C.

#### **RADIUM-226 BY GAMMA SPEC (21 DAY INGROWTH)**

Samples PE2-RSYB2-DC-B-S001 (160-30103-1), PE2-RSYB2-DC-B-S002 (160-30103-2), PE2-RSYB2-DC-B-S003 (160-30103-3), PE2-RSYB2-DC-B-S004 (160-30103-4), PE2-RSYB2-DC-B-S005 (160-30103-5), PE2-RSYB2-DC-B-S006 (160-30103-6), PE2-RSYB2-DC-B-S007 (160-30103-7) and PE2-RSYB2-DC-B-S008 (160-30103-8) were analyzed for Radium-226 by gamma spec (21 day ingrowth) in accordance with EPA GA\_01\_R. The samples were dried on 08/10/2018, prepared on 08/13/2018 and analyzed on 09/03/2018 and 09/04/2018.

The following sample exhibited a negative result greater in magnitude than the 3 sigma TPU: (MB 160-382055/1-A) This occurrence was evaluated and determined to be random in nature. Sporadic occurrences such as this are statistically expected. No further action is required.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

# CHAIN OF CUSTODY

Ref. Document # PE2\_RSYB2\_DC\_BIASED#601



4005 Port Chicago Hwy  
Concord, CA 94520

Project Number: 500506

Project Manager: Nels Johnson

(Name & phone #)

Send Report To: Eddie Kalombo

Phone/Fax Number: 415-987-0760

Address: 4005 Port Chicago Hwy

City: Concord, CA, 94520

Sample ID Number	Sample Description	Date	Time	Method	Matrix	Preservative (soil)	Container Type	# of Containers	Project Specific:
PE2-RSYB2-DC-B-S001	Parcel E-2 RSYB2 Biased	8/2/18	0320	G	SO	1	16 oz. plastic jar	X	
PE2-RSYB2-DC-B-S002	Parcel E-2 RSYB2 Biased	8/2/18	0326	G	SO	1	16 oz. plastic jar	X	
PE2-RSYB2-DC-B-S003	Parcel E-2 RSYB2 Biased	8/2/18	0332	G	SO	1	16 oz. plastic jar	X	
PE2-RSYB2-DC-B-S004	Parcel E-2 RSYB2 Biased	8/2/18	0338	G	SO	1	16 oz. plastic jar	X	
PE2-RSYB2-DC-B-S005	Parcel E-2 RSYB2 Biased	8/2/18	0344	G	SO	1	16 oz. plastic jar	X	
PE2-RSYB2-DC-B-S006	Parcel E-2 RSYB2 Biased	8/2/18	0350	G	SO	1	16 oz. plastic jar	X	
PE2-RSYB2-DC-B-S007	Parcel E-2 RSYB2 Biased	8/2/18	0355	G	SO	1	16 oz. plastic jar	X	
PE2-RSYB2-DC-B-S008	Parcel E-2 RSYB2 Biased	8/2/18	0358	G	SO	1	16 oz. plastic jar	X	

## Special Instructions:

Analyze for Total Strontium as a screening step, and isotopic Sr-90 only if Total Strontium is above project action limit of 0.331 pCi/g.

Level Of QC Required:		Project Specific:		Method Codes		Matrix Codes	
<input type="checkbox"/>	24-hr	<input type="checkbox"/>	3-day	<input type="checkbox"/>	10-day	<input checked="" type="checkbox"/>	
<u>Standard TAT - 10-day</u>	<u>Reinquished By:</u>  <u>J. Donald Remond</u>	<u>Date:</u> <u>8/2/18</u>	<u>Received By:</u>  <u>M1 NHSEC L41</u>	<u>Time:</u> <u>1400</u>	<u>Date:</u> <u>8/2/18</u>	<u>Time:</u> <u>1400</u>	<u>G = Grab</u>
<u>3-day</u>	<u>Reinquished By:</u>  <u>M1 NHSEC L41</u>	<u>Date:</u> <u>8/4/18</u>	<u>Received By:</u>  <u>M1 NHSEC L41</u>	<u>Time:</u> <u>1000</u>	<u>Date:</u> <u>8/10/18</u>	<u>Time:</u> <u>0830</u>	<u>DW = Drinking Water</u>
<u>10-day</u>	<u>Reinquished By:</u>  <u>M1 NHSEC L41</u>	<u>Date:</u> <u>8/4/18</u>	<u>Received By:</u>  <u>M1 NHSEC L41</u>	<u>Time:</u> <u>1000</u>	<u>Date:</u> <u>8/10/18</u>	<u>Time:</u> <u>0830</u>	<u>GW = Ground Water</u>
	<u>Reinquished By:</u>  <u>Air</u>	<u>Date:</u> <u>Air</u>	<u>Received By:</u>  <u>Air</u>	<u>Time:</u> <u>Air</u>	<u>Date:</u> <u>Air</u>	<u>Time:</u> <u>Air</u>	<u>WW = Waste Water</u>
							<u>SO = Soil</u>
							<u>SL = Sludge</u>
							<u>CP = Chip Samples</u>
							<u>ABS = Asbestos, PO = Pipe Opening</u>



160-30103 Chain of Custody

1 2 3 4 5 6 7 8 9 10 11

## Login Sample Receipt Checklist

Client: Aptim Federal Services LLC

Job Number: 160-30103-2

**Login Number: 30103****List Number: 1****Creator: Press, Nicholas B****List Source: TestAmerica St. Louis**

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	N/A	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

## Definitions/Glossary

Client: Aptim Federal Services LLC  
 Project/Site: Hunters Point Naval Shipyard - Parcel E2

TestAmerica Job ID: 160-30103-2

### **Qualifiers**

#### **Rad**

<b>Qualifier</b>	<b>Qualifier Description</b>
U	Undetected at the Limit of Detection.

### **Glossary**

#### **Abbreviation** **These commonly used abbreviations may or may not be present in this report.**

□	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

## Method Summary

Client: Aptim Federal Services LLC

Project/Site: Hunters Point Naval Shipyard - Parcel E2

TestAmerica Job ID: 160-30103-2

Method	Method Description	Protocol	Laboratory
GA-01-R	Radium-226 & Other Gamma Emitters (GS)	DOE	TAL SL
Dry and Grind	Preparation, Dry and Grind	None	TAL SL
Fill_Geo-21	Fill Geometry, 21-Day In-Growth	None	TAL SL

**Protocol References:**

DOE = U.S. Department of Energy

None = None

**Laboratory References:**

TAL SL = TestAmerica St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

1

2

3

4

5

6

7

8

9

10

11

## Sample Summary

Client: Aptim Federal Services LLC

Project/Site: Hunters Point Naval Shipyard - Parcel E2

TestAmerica Job ID: 160-30103-2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
160-30103-1	PE2-RSYB2-DC-B-S001	Solid	08/02/18 08:20	08/10/18 08:30
160-30103-2	PE2-RSYB2-DC-B-S002	Solid	08/02/18 08:26	08/10/18 08:30
160-30103-3	PE2-RSYB2-DC-B-S003	Solid	08/02/18 08:32	08/10/18 08:30
160-30103-4	PE2-RSYB2-DC-B-S004	Solid	08/02/18 08:38	08/10/18 08:30
160-30103-5	PE2-RSYB2-DC-B-S005	Solid	08/02/18 08:44	08/10/18 08:30
160-30103-6	PE2-RSYB2-DC-B-S006	Solid	08/02/18 08:50	08/10/18 08:30
160-30103-7	PE2-RSYB2-DC-B-S007	Solid	08/02/18 08:55	08/10/18 08:30
160-30103-8	PE2-RSYB2-DC-B-S008	Solid	08/02/18 08:58	08/10/18 08:30

1

2

3

4

5

6

7

8

9

10

11

# Client Sample Results

Client: Aptim Federal Services LLC

Project/Site: Hunters Point Naval Shipyard - Parcel E2

TestAmerica Job ID: 160-30103-2

**Client Sample ID: PE2-RSYB2-DC-B-S001****Lab Sample ID: 160-30103-1**

Date Collected: 08/02/18 08:20

Matrix: Solid

Date Received: 08/10/18 08:30

**Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)**

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
<b>Actinium 228</b>	<b>0.837</b>		0.183	0.202		0.0270	pCi/g	08/13/18 14:52	09/04/18 07:56	1
Actinium-227	-0.283	U	0.594	0.595		0.488	pCi/g	08/13/18 14:52	09/04/18 07:56	1
Bismuth-212	0.300	U	0.822	0.823		0.655	pCi/g	08/13/18 14:52	09/04/18 07:56	1
<b>Bismuth-214</b>	<b>0.701</b>		0.145	0.162		0.0516	pCi/g	08/13/18 14:52	09/04/18 07:56	1
Cesium-137	-0.0134	U	0.0840	0.0840	0.0700	0.0625	pCi/g	08/13/18 14:52	09/04/18 07:56	1
Cobalt-60	-0.00306	U	0.0685	0.0685	0.200	0.0349	pCi/g	08/13/18 14:52	09/04/18 07:56	1
<b>Lead-210</b>	<b>1.12</b>		1.25	1.26		0.822	pCi/g	08/13/18 14:52	09/04/18 07:56	1
<b>Lead-212</b>	<b>0.780</b>		0.113	0.152		0.0551	pCi/g	08/13/18 14:52	09/04/18 07:56	1
<b>Lead-214</b>	<b>0.639</b>		0.133	0.148		0.0680	pCi/g	08/13/18 14:52	09/04/18 07:56	1
<b>Potassium-40</b>	<b>19.4</b>		1.91	2.76		0.209	pCi/g	08/13/18 14:52	09/04/18 07:56	1
Protactinium-231	-0.814	U	3.01	3.01		2.46	pCi/g	08/13/18 14:52	09/04/18 07:56	1
<b>Radium-226</b>	<b>0.701</b>		0.145	0.162	0.700	0.0516	pCi/g	08/13/18 14:52	09/04/18 07:56	1
<b>Radium-228</b>	<b>0.837</b>		0.183	0.202		0.0270	pCi/g	08/13/18 14:52	09/04/18 07:56	1
<b>Thallium-208</b>	<b>0.273</b>		0.0680	0.0737		0.0247	pCi/g	08/13/18 14:52	09/04/18 07:56	1
<b>Thorium-228</b>	<b>0.780</b>		0.113	0.152		0.0551	pCi/g	08/13/18 14:52	09/04/18 07:56	1
<b>Thorium-232</b>	<b>0.837</b>		0.183	0.202		0.0270	pCi/g	08/13/18 14:52	09/04/18 07:56	1
Thorium-234	0.241	U	0.586	0.586		0.968	pCi/g	08/13/18 14:52	09/04/18 07:56	1
Uranium-235	-0.0204	U	0.0312	0.0312		0.368	pCi/g	08/13/18 14:52	09/04/18 07:56	1
Uranium-238	0.241	U	0.586	0.586		0.968	pCi/g	08/13/18 14:52	09/04/18 07:56	1

**Client Sample ID: PE2-RSYB2-DC-B-S002****Lab Sample ID: 160-30103-2**

Date Collected: 08/02/18 08:26

Matrix: Solid

Date Received: 08/10/18 08:30

**Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)**

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert. (2σ+/-)	Uncert. (2σ+/-)						
<b>Actinium 228</b>	<b>0.736</b>		0.173	0.189		0.0383	pCi/g	08/13/18 14:52	09/03/18 17:31	1
Actinium-227	-0.187	U	0.736	0.736		0.601	pCi/g	08/13/18 14:52	09/03/18 17:31	1
Bismuth-212	0.459	U	0.746	0.748		0.585	pCi/g	08/13/18 14:52	09/03/18 17:31	1
<b>Bismuth-214</b>	<b>0.631</b>		0.125	0.141		0.0416	pCi/g	08/13/18 14:52	09/03/18 17:31	1
Cesium-137	0.0309	U	0.0529	0.0530	0.0700	0.0412	pCi/g	08/13/18 14:52	09/03/18 17:31	1
Cobalt-60	0.000156	U	0.000234	0.000235	0.200	0.0427	pCi/g	08/13/18 14:52	09/03/18 17:31	1
Lead-210	0.667	U	1.56	1.56		1.26	pCi/g	08/13/18 14:52	09/03/18 17:31	1
<b>Lead-212</b>	<b>0.711</b>		0.0990	0.135		0.0482	pCi/g	08/13/18 14:52	09/03/18 17:31	1
<b>Lead-214</b>	<b>0.654</b>		0.101	0.121		0.0452	pCi/g	08/13/18 14:52	09/03/18 17:31	1
<b>Potassium-40</b>	<b>16.1</b>		1.58	2.29		0.293	pCi/g	08/13/18 14:52	09/03/18 17:31	1
Protactinium-231	0.659	U	1.79	1.79		1.96	pCi/g	08/13/18 14:52	09/03/18 17:31	1
<b>Radium-226</b>	<b>0.631</b>		0.125	0.141	0.700	0.0416	pCi/g	08/13/18 14:52	09/03/18 17:31	1
<b>Radium-228</b>	<b>0.736</b>		0.173	0.189		0.0383	pCi/g	08/13/18 14:52	09/03/18 17:31	1
<b>Thallium-208</b>	<b>0.253</b>		0.0626	0.0679		0.0226	pCi/g	08/13/18 14:52	09/03/18 17:31	1
<b>Thorium-228</b>	<b>0.711</b>		0.0990	0.135		0.0482	pCi/g	08/13/18 14:52	09/03/18 17:31	1
<b>Thorium-232</b>	<b>0.736</b>		0.173	0.189		0.0383	pCi/g	08/13/18 14:52	09/03/18 17:31	1
Thorium-234	0.504	U	0.599	0.602		1.12	pCi/g	08/13/18 14:52	09/03/18 17:31	1
Uranium-235	0.143	U	0.227	0.227		0.180	pCi/g	08/13/18 14:52	09/03/18 17:31	1
Uranium-238	0.504	U	0.599	0.602		1.12	pCi/g	08/13/18 14:52	09/03/18 17:31	1

# Client Sample Results

Client: Aptim Federal Services LLC

Project/Site: Hunters Point Naval Shipyard - Parcel E2

TestAmerica Job ID: 160-30103-2

**Client Sample ID: PE2-RSYB2-DC-B-S003**

Date Collected: 08/02/18 08:32

Date Received: 08/10/18 08:30

**Lab Sample ID: 160-30103-3**

Matrix: Solid

**Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)**

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
<b>Actinium 228</b>	<b>0.609</b>		0.321	0.327		0.147	pCi/g	08/13/18 14:52	09/03/18 18:22	1
Actinium-227	0.0983	U	0.312	0.313		0.736	pCi/g	08/13/18 14:52	09/03/18 18:22	1
Bismuth-212	-0.319	U	1.66	1.66		0.794	pCi/g	08/13/18 14:52	09/03/18 18:22	1
<b>Bismuth-214</b>	<b>0.663</b>		0.144	0.159		0.0407	pCi/g	08/13/18 14:52	09/03/18 18:22	1
Cesium-137	-0.0423	U	0.136	0.136	0.0700	0.0696	pCi/g	08/13/18 14:52	09/03/18 18:22	1
Cobalt-60	0.0176	U	0.0265	0.0265	0.200	0.0454	pCi/g	08/13/18 14:52	09/03/18 18:22	1
Lead-210	0.875	U	1.86	1.86		1.50	pCi/g	08/13/18 14:52	09/03/18 18:22	1
<b>Lead-212</b>	<b>0.816</b>		0.117	0.157		0.0521	pCi/g	08/13/18 14:52	09/03/18 18:22	1
<b>Lead-214</b>	<b>0.759</b>		0.163	0.181		0.0606	pCi/g	08/13/18 14:52	09/03/18 18:22	1
<b>Potassium-40</b>	<b>17.6</b>		1.95	2.65		0.242	pCi/g	08/13/18 14:52	09/03/18 18:22	1
Protactinium-231	-0.133	U	3.16	3.16		2.60	pCi/g	08/13/18 14:52	09/03/18 18:22	1
<b>Radium-226</b>	<b>0.663</b>		0.144	0.159	0.700	0.0407	pCi/g	08/13/18 14:52	09/03/18 18:22	1
<b>Radium-228</b>	<b>0.609</b>		0.321	0.327		0.147	pCi/g	08/13/18 14:52	09/03/18 18:22	1
<b>Thallium-208</b>	<b>0.294</b>		0.0874	0.0926		0.0333	pCi/g	08/13/18 14:52	09/03/18 18:22	1
<b>Thorium-228</b>	<b>0.816</b>		0.117	0.157		0.0521	pCi/g	08/13/18 14:52	09/03/18 18:22	1
<b>Thorium-232</b>	<b>0.609</b>		0.321	0.327		0.147	pCi/g	08/13/18 14:52	09/03/18 18:22	1
<b>Thorium-234</b>	<b>1.44</b>		0.704	0.719		0.916	pCi/g	08/13/18 14:52	09/03/18 18:22	1
Uranium-235	0.0889	U	0.192	0.192		0.465	pCi/g	08/13/18 14:52	09/03/18 18:22	1
<b>Uranium-238</b>	<b>1.44</b>		0.704	0.719		0.916	pCi/g	08/13/18 14:52	09/03/18 18:22	1

**Client Sample ID: PE2-RSYB2-DC-B-S004**

Date Collected: 08/02/18 08:38

Date Received: 08/10/18 08:30

**Lab Sample ID: 160-30103-4**

Matrix: Solid

**Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)**

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
<b>Actinium 228</b>	<b>0.839</b>		0.159	0.181		0.0645	pCi/g	08/13/18 14:52	09/03/18 18:23	1
Actinium-227	-0.374	U	0.482	0.484		0.603	pCi/g	08/13/18 14:52	09/03/18 18:23	1
Bismuth-212	0.410	U	0.671	0.673		0.524	pCi/g	08/13/18 14:52	09/03/18 18:23	1
<b>Bismuth-214</b>	<b>0.669</b>		0.125	0.143		0.0524	pCi/g	08/13/18 14:52	09/03/18 18:23	1
Cesium-137	-0.0298	U	0.0715	0.0715	0.0700	0.0573	pCi/g	08/13/18 14:52	09/03/18 18:23	1
<b>Cobalt-60</b>	<b>0.0574</b>		0.0278	0.0284	0.200	0.00786	pCi/g	08/13/18 14:52	09/03/18 18:23	1
Lead-210	-0.199	U	1.02	1.02		1.28	pCi/g	08/13/18 14:52	09/03/18 18:23	1
<b>Lead-212</b>	<b>0.810</b>		0.0997	0.145		0.0438	pCi/g	08/13/18 14:52	09/03/18 18:23	1
<b>Lead-214</b>	<b>0.630</b>		0.132	0.147		0.0546	pCi/g	08/13/18 14:52	09/03/18 18:23	1
<b>Potassium-40</b>	<b>16.2</b>		1.51	2.24		0.212	pCi/g	08/13/18 14:52	09/03/18 18:23	1
Protactinium-231	-0.912	U	3.02	3.02		2.47	pCi/g	08/13/18 14:52	09/03/18 18:23	1
<b>Radium-226</b>	<b>0.669</b>		0.125	0.143	0.700	0.0524	pCi/g	08/13/18 14:52	09/03/18 18:23	1
<b>Radium-228</b>	<b>0.839</b>		0.159	0.181		0.0645	pCi/g	08/13/18 14:52	09/03/18 18:23	1
<b>Thallium-208</b>	<b>0.292</b>		0.0647	0.0715		0.0235	pCi/g	08/13/18 14:52	09/03/18 18:23	1
<b>Thorium-228</b>	<b>0.810</b>		0.0997	0.145		0.0438	pCi/g	08/13/18 14:52	09/03/18 18:23	1
<b>Thorium-232</b>	<b>0.839</b>		0.159	0.181		0.0645	pCi/g	08/13/18 14:52	09/03/18 18:23	1
Thorium-234	0.307	U	0.318	0.320		1.21	pCi/g	08/13/18 14:52	09/03/18 18:23	1
Uranium-235	0.210	U	0.367	0.368		0.388	pCi/g	08/13/18 14:52	09/03/18 18:23	1
Uranium-238	0.307	U	0.318	0.320		1.21	pCi/g	08/13/18 14:52	09/03/18 18:23	1

# Client Sample Results

Client: Aptim Federal Services LLC

Project/Site: Hunters Point Naval Shipyard - Parcel E2

TestAmerica Job ID: 160-30103-2

**Client Sample ID: PE2-RSYB2-DC-B-S005**

Date Collected: 08/02/18 08:44

Date Received: 08/10/18 08:30

**Lab Sample ID: 160-30103-5**

Matrix: Solid

**Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)**

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
<b>Actinium 228</b>	<b>0.913</b>		0.184	0.206		0.0525	pCi/g	08/13/18 14:52	09/03/18 18:58	1
Actinium-227	-0.391	U	0.695	0.696		0.647	pCi/g	08/13/18 14:52	09/03/18 18:58	1
Bismuth-212	-0.0594	U	0.747	0.747		0.611	pCi/g	08/13/18 14:52	09/03/18 18:58	1
<b>Bismuth-214</b>	<b>0.572</b>		0.122	0.136		0.0464	pCi/g	08/13/18 14:52	09/03/18 18:58	1
Cesium-137	0.0347	U	0.0567	0.0568	0.0700	0.0442	pCi/g	08/13/18 14:52	09/03/18 18:58	1
Cobalt-60	0.0108	U	0.0707	0.0707	0.200	0.0346	pCi/g	08/13/18 14:52	09/03/18 18:58	1
Lead-210	-0.731	U	1.47	1.47		1.38	pCi/g	08/13/18 14:52	09/03/18 18:58	1
<b>Lead-212</b>	<b>0.642</b>		0.0908	0.123		0.0387	pCi/g	08/13/18 14:52	09/03/18 18:58	1
<b>Lead-214</b>	<b>0.592</b>		0.117	0.132		0.0628	pCi/g	08/13/18 14:52	09/03/18 18:58	1
<b>Potassium-40</b>	<b>16.7</b>		1.58	2.33		0.226	pCi/g	08/13/18 14:52	09/03/18 18:58	1
Protactinium-231	-0.826	U	2.70	2.70		2.20	pCi/g	08/13/18 14:52	09/03/18 18:58	1
<b>Radium-226</b>	<b>0.572</b>		0.122	0.136	0.700	0.0464	pCi/g	08/13/18 14:52	09/03/18 18:58	1
<b>Radium-228</b>	<b>0.913</b>		0.184	0.206		0.0525	pCi/g	08/13/18 14:52	09/03/18 18:58	1
<b>Thallium-208</b>	<b>0.253</b>		0.0772	0.0815		0.0319	pCi/g	08/13/18 14:52	09/03/18 18:58	1
<b>Thorium-228</b>	<b>0.642</b>		0.0908	0.123		0.0387	pCi/g	08/13/18 14:52	09/03/18 18:58	1
<b>Thorium-232</b>	<b>0.913</b>		0.184	0.206		0.0525	pCi/g	08/13/18 14:52	09/03/18 18:58	1
Thorium-234	0.605	U	1.40	1.40		1.14	pCi/g	08/13/18 14:52	09/03/18 18:58	1
Uranium-235	-0.172	U	0.293	0.293		0.360	pCi/g	08/13/18 14:52	09/03/18 18:58	1
Uranium-238	0.605	U	1.40	1.40		1.14	pCi/g	08/13/18 14:52	09/03/18 18:58	1

**Client Sample ID: PE2-RSYB2-DC-B-S006**

Date Collected: 08/02/18 08:50

Date Received: 08/10/18 08:30

**Lab Sample ID: 160-30103-6**

Matrix: Solid

**Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)**

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
<b>Actinium 228</b>	<b>1.00</b>		0.215	0.238		0.0610	pCi/g	08/13/18 14:52	09/03/18 18:59	1
Actinium-227	0.432	U	0.911	0.912		0.735	pCi/g	08/13/18 14:52	09/03/18 18:59	1
Bismuth-212	-0.314	U	0.925	0.925		0.791	pCi/g	08/13/18 14:52	09/03/18 18:59	1
<b>Bismuth-214</b>	<b>0.772</b>		0.154	0.174		0.0424	pCi/g	08/13/18 14:52	09/03/18 18:59	1
Cesium-137	-0.0141	U	0.0757	0.0757	0.0700	0.0631	pCi/g	08/13/18 14:52	09/03/18 18:59	1
Cobalt-60	-0.0219	U	0.0466	0.0467	0.200	0.0537	pCi/g	08/13/18 14:52	09/03/18 18:59	1
Lead-210	-1.06	U	1.59	1.60		1.59	pCi/g	08/13/18 14:52	09/03/18 18:59	1
<b>Lead-212</b>	<b>0.838</b>		0.117	0.159		0.0499	pCi/g	08/13/18 14:52	09/03/18 18:59	1
<b>Lead-214</b>	<b>0.777</b>		0.128	0.151		0.0583	pCi/g	08/13/18 14:52	09/03/18 18:59	1
<b>Potassium-40</b>	<b>19.4</b>		2.06	2.86		0.243	pCi/g	08/13/18 14:52	09/03/18 18:59	1
Protactinium-231	0.537	U	3.18	3.18		2.60	pCi/g	08/13/18 14:52	09/03/18 18:59	1
<b>Radium-226</b>	<b>0.772</b>		0.154	0.174	0.700	0.0424	pCi/g	08/13/18 14:52	09/03/18 18:59	1
<b>Radium-228</b>	<b>1.00</b>		0.215	0.238		0.0610	pCi/g	08/13/18 14:52	09/03/18 18:59	1
<b>Thallium-208</b>	<b>0.305</b>		0.0847	0.0904		0.0299	pCi/g	08/13/18 14:52	09/03/18 18:59	1
<b>Thorium-228</b>	<b>0.838</b>		0.117	0.159		0.0499	pCi/g	08/13/18 14:52	09/03/18 18:59	1
<b>Thorium-232</b>	<b>1.00</b>		0.215	0.238		0.0610	pCi/g	08/13/18 14:52	09/03/18 18:59	1
Thorium-234	0.000698	U	1.70	1.70		1.40	pCi/g	08/13/18 14:52	09/03/18 18:59	1
Uranium-235	0.0000360	U	0.000231	0.000231		0.538	pCi/g	08/13/18 14:52	09/03/18 18:59	1
Uranium-238	0.000698	U	1.70	1.70		1.40	pCi/g	08/13/18 14:52	09/03/18 18:59	1

# Client Sample Results

Client: Aptim Federal Services LLC

Project/Site: Hunters Point Naval Shipyard - Parcel E2

TestAmerica Job ID: 160-30103-2

**Client Sample ID: PE2-RSYB2-DC-B-S007****Lab Sample ID: 160-30103-7**

Date Collected: 08/02/18 08:55

Matrix: Solid

Date Received: 08/10/18 08:30

**Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)**

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
<b>Actinium 228</b>	<b>0.928</b>		0.385	0.396		0.163	pCi/g	08/13/18 14:52	09/03/18 19:00	1
Actinium-227	-0.402	U	0.877	0.878		0.593	pCi/g	08/13/18 14:52	09/03/18 19:00	1
Bismuth-212	0.360	U	0.711	0.712		0.541	pCi/g	08/13/18 14:52	09/03/18 19:00	1
<b>Bismuth-214</b>	<b>0.681</b>		0.174	0.188		0.0549	pCi/g	08/13/18 14:52	09/03/18 19:00	1
Cesium-137	0.0115	U	0.0828	0.0828	0.0700	0.0671	pCi/g	08/13/18 14:52	09/03/18 19:00	1
Cobalt-60	0.0470	U	0.0463	0.0466	0.200	0.0492	pCi/g	08/13/18 14:52	09/03/18 19:00	1
Lead-210	-0.205	U	1.69	1.69		1.19	pCi/g	08/13/18 14:52	09/03/18 19:00	1
<b>Lead-212</b>	<b>0.786</b>		0.120	0.157		0.0464	pCi/g	08/13/18 14:52	09/03/18 19:00	1
<b>Lead-214</b>	<b>0.707</b>		0.170	0.185		0.0698	pCi/g	08/13/18 14:52	09/03/18 19:00	1
<b>Potassium-40</b>	<b>15.1</b>		2.03	2.55		0.309	pCi/g	08/13/18 14:52	09/03/18 19:00	1
Protactinium-231	0.000	U	0.955	0.955		2.64	pCi/g	08/13/18 14:52	09/03/18 19:00	1
<b>Radium-226</b>	<b>0.681</b>		0.174	0.188	0.700	0.0549	pCi/g	08/13/18 14:52	09/03/18 19:00	1
<b>Radium-228</b>	<b>0.928</b>		0.385	0.396		0.163	pCi/g	08/13/18 14:52	09/03/18 19:00	1
<b>Thallium-208</b>	<b>0.289</b>		0.0731	0.0790		0.0167	pCi/g	08/13/18 14:52	09/03/18 19:00	1
<b>Thorium-228</b>	<b>0.786</b>		0.120	0.157		0.0464	pCi/g	08/13/18 14:52	09/03/18 19:00	1
<b>Thorium-232</b>	<b>0.928</b>		0.385	0.396		0.163	pCi/g	08/13/18 14:52	09/03/18 19:00	1
Thorium-234	0.287	U	0.436	0.437		1.05	pCi/g	08/13/18 14:52	09/03/18 19:00	1
Uranium-235	0.159	U	0.382	0.382		0.296	pCi/g	08/13/18 14:52	09/03/18 19:00	1
Uranium-238	0.287	U	0.436	0.437		1.05	pCi/g	08/13/18 14:52	09/03/18 19:00	1

**Client Sample ID: PE2-RSYB2-DC-B-S008****Lab Sample ID: 160-30103-8**

Date Collected: 08/02/18 08:58

Matrix: Solid

Date Received: 08/10/18 08:30

**Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)**

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			(2σ+/-)	(2σ+/-)						
<b>Actinium 228</b>	<b>0.780</b>		0.203	0.218		0.128	pCi/g	08/13/18 14:52	09/03/18 19:33	1
Actinium-227	-0.283	U	0.683	0.684		0.653	pCi/g	08/13/18 14:52	09/03/18 19:33	1
<b>Bismuth-212</b>	<b>1.32</b>		0.552	0.568		0.196	pCi/g	08/13/18 14:52	09/03/18 19:33	1
<b>Bismuth-214</b>	<b>0.715</b>		0.146	0.164		0.0475	pCi/g	08/13/18 14:52	09/03/18 19:33	1
Cesium-137	0.000	U	0.0286	0.0286	0.0700	0.0389	pCi/g	08/13/18 14:52	09/03/18 19:33	1
Cobalt-60	-0.0352	U	0.0877	0.0878	0.200	0.0422	pCi/g	08/13/18 14:52	09/03/18 19:33	1
Lead-210	-0.830	U	1.45	1.45		1.25	pCi/g	08/13/18 14:52	09/03/18 19:33	1
<b>Lead-212</b>	<b>0.817</b>		0.100	0.146		0.0435	pCi/g	08/13/18 14:52	09/03/18 19:33	1
<b>Lead-214</b>	<b>0.738</b>		0.128	0.150		0.0500	pCi/g	08/13/18 14:52	09/03/18 19:33	1
<b>Potassium-40</b>	<b>16.2</b>		1.52	2.25		0.213	pCi/g	08/13/18 14:52	09/03/18 19:33	1
Protactinium-231	0.000	U	0.428	0.428		2.29	pCi/g	08/13/18 14:52	09/03/18 19:33	1
<b>Radium-226</b>	<b>0.715</b>		0.146	0.164	0.700	0.0475	pCi/g	08/13/18 14:52	09/03/18 19:33	1
<b>Radium-228</b>	<b>0.780</b>		0.203	0.218		0.128	pCi/g	08/13/18 14:52	09/03/18 19:33	1
<b>Thallium-208</b>	<b>0.267</b>		0.0605	0.0665		0.0212	pCi/g	08/13/18 14:52	09/03/18 19:33	1
<b>Thorium-228</b>	<b>0.817</b>		0.100	0.146		0.0435	pCi/g	08/13/18 14:52	09/03/18 19:33	1
<b>Thorium-232</b>	<b>0.780</b>		0.203	0.218		0.128	pCi/g	08/13/18 14:52	09/03/18 19:33	1
Thorium-234	0.549	U	0.387	0.391		0.622	pCi/g	08/13/18 14:52	09/03/18 19:33	1
Uranium-235	-0.188	U	0.288	0.288		0.425	pCi/g	08/13/18 14:52	09/03/18 19:33	1
Uranium-238	0.549	U	0.387	0.391		0.622	pCi/g	08/13/18 14:52	09/03/18 19:33	1

# QC Sample Results

Client: Aptim Federal Services LLC

Project/Site: Hunters Point Naval Shipyard - Parcel E2

TestAmerica Job ID: 160-30103-2

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Lab Sample ID: MB 160-382055/1-A

Matrix: Solid

Analysis Batch: 386842

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 382055

Analyte	Result	MB MB MB	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
				Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Thorium-234	1.044			1.10	1.10		0.677	pCi/g	08/13/18 14:52	09/03/18 16:37	1
Uranium-238	1.044			1.10	1.10		0.677	pCi/g	08/13/18 14:52	09/03/18 16:37	1

Lab Sample ID: MB 160-382055/1-A

Matrix: Solid

Analysis Batch: 386858

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 382055

Analyte	Result	MB MB MB	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
				Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Actinium 228	0.09095			0.0743	0.0748		0.0292	pCi/g	08/13/18 14:52	09/04/18 07:53	1
Actinium-227	0.1280	U		0.359	0.359		0.282	pCi/g	08/13/18 14:52	09/04/18 07:53	1
Bismuth-212	0.0000	U		0.256	0.256		0.306	pCi/g	08/13/18 14:52	09/04/18 07:53	1
Bismuth-214	-0.004323	U		0.00532	0.00534		0.0868	pCi/g	08/13/18 14:52	09/04/18 07:53	1
Cesium-137	0.01799	U		0.0350	0.0350	0.0700	0.0258	pCi/g	08/13/18 14:52	09/04/18 07:53	1
Cobalt-60	-0.008186	U		0.0563	0.0563	0.200	0.0272	pCi/g	08/13/18 14:52	09/04/18 07:53	1
Lead-210	-0.5712	U		0.164	0.177		0.926	pCi/g	08/13/18 14:52	09/04/18 07:53	1
Lead-212	-0.05759	U		0.0663	0.0667		0.0697	pCi/g	08/13/18 14:52	09/04/18 07:53	1
Lead-214	-0.004869	U		0.0750	0.0750		0.0614	pCi/g	08/13/18 14:52	09/04/18 07:53	1
Potassium-40	0.01476	U		0.700	0.700		0.418	pCi/g	08/13/18 14:52	09/04/18 07:53	1
Protactinium-231	0.3603	U		2.39	2.39		1.96	pCi/g	08/13/18 14:52	09/04/18 07:53	1
Radium-226	-0.004323	U		0.00532	0.00534	0.700	0.0868	pCi/g	08/13/18 14:52	09/04/18 07:53	1
Radium-228	0.09095			0.0743	0.0748		0.0292	pCi/g	08/13/18 14:52	09/04/18 07:53	1
Thallium-208	0.03255			0.0387	0.0389		0.0207	pCi/g	08/13/18 14:52	09/04/18 07:53	1
Thorium-228	-0.05759	U		0.0663	0.0667		0.0697	pCi/g	08/13/18 14:52	09/04/18 07:53	1
Thorium-232	0.09095			0.0743	0.0748		0.0292	pCi/g	08/13/18 14:52	09/04/18 07:53	1
Uranium-235	0.05263	U		0.105	0.105		0.310	pCi/g	08/13/18 14:52	09/04/18 07:53	1

Lab Sample ID: LCS 160-382055/2-A

Matrix: Solid

Analysis Batch: 386843

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 382055

Analyte	Spike Added	LCS Result	LCS Qual	Total	LOQ	DLC	Unit	%Rec	%Rec. Limits
				Uncert. (2σ+/-)					
Americium-241	96.8	98.65		10.4		0.644	pCi/g	102	87 - 116
Cesium-137	28.2	28.30		3.05	0.0700	0.102	pCi/g	100	87 - 120
Cobalt-60	12.8	12.45		1.33	0.200	0.0186	pCi/g	97	87 - 115

Lab Sample ID: 160-30103-1 DU

Matrix: Solid

Analysis Batch: 386843

Client Sample ID: PE2-RSYB2-DC-B-S001

Prep Type: Total/NA

Prep Batch: 382055

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total	LOQ	DLC	Unit	RER	Limit
					Uncert. (2σ+/-)					
Actinium 228	0.837		1.077		0.219		0.0641	pCi/g	0.57	1
Actinium-227	-0.283	U	-0.01090	U	0.0215		0.572	pCi/g	0.44	1
Bismuth-212	0.300	U	-0.7672	U	1.30		1.02	pCi/g	0.50	1
Bismuth-214	0.701		0.5957		0.160		0.0433	pCi/g	0.33	1
Cesium-137	-0.0134	U	0.01518	U	0.0624	0.0700	0.0495	pCi/g	0.20	1

# QC Sample Results

Client: Aptim Federal Services LLC

Project/Site: Hunters Point Naval Shipyard - Parcel E2

TestAmerica Job ID: 160-30103-2

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

Lab Sample ID: 160-30103-1 DU

Client Sample ID: PE2-RSYB2-DC-B-S001

Matrix: Solid

Prep Type: Total/NA

Analysis Batch: 386843

Prep Batch: 382055

Analyte	Sample	Sample	DU		DU		Total		LOQ	DLC	Unit	RER	RER Limit
	Result	Qual	Result	Qual	Uncert. (2σ+/-)								
Cobalt-60	-0.00306	U	0.002050	U	0.0268		0.200	0.0469	pCi/g			0.05	1
Lead-210	1.12		0.07309	U	1.73			1.21	pCi/g			0.35	1
Lead-212	0.780		0.7403		0.149			0.0442	pCi/g			0.13	1
Lead-214	0.639		0.7789		0.169			0.0658	pCi/g			0.44	1
Potassium-40	19.4		17.54		2.78			0.295	pCi/g			0.33	1
Protactinium-231	-0.814	U	-0.9518	U	3.23			2.63	pCi/g			0.02	1
Radium-226	0.701		0.5957		0.160	0.700	0.0433	pCi/g				0.33	1
Radium-228	0.837		1.077		0.219			0.0641	pCi/g			0.57	1
Thallium-208	0.273		0.2967		0.0821			0.0250	pCi/g			0.15	1
Thorium-228	0.780		0.7403		0.149			0.0442	pCi/g			0.13	1
Thorium-232	0.837		1.077		0.219			0.0641	pCi/g			0.57	1
Thorium-234	0.241	U	1.567		1.41			0.928	pCi/g			0.66	1
Uranium-235	-0.0204	U	0.1324	U	0.271			0.343	pCi/g			0.51	1
Uranium-238	0.241	U	1.567		1.41			0.928	pCi/g			0.66	1

# QC Association Summary

Client: Aptim Federal Services LLC

Project/Site: Hunters Point Naval Shipyard - Parcel E2

TestAmerica Job ID: 160-30103-2

**Rad****Leach Batch: 381621**

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-30103-1	PE2-RSYB2-DC-B-S001	Total/NA	Solid	Dry and Grind	
160-30103-2	PE2-RSYB2-DC-B-S002	Total/NA	Solid	Dry and Grind	
160-30103-3	PE2-RSYB2-DC-B-S003	Total/NA	Solid	Dry and Grind	
160-30103-4	PE2-RSYB2-DC-B-S004	Total/NA	Solid	Dry and Grind	
160-30103-5	PE2-RSYB2-DC-B-S005	Total/NA	Solid	Dry and Grind	
160-30103-6	PE2-RSYB2-DC-B-S006	Total/NA	Solid	Dry and Grind	
160-30103-7	PE2-RSYB2-DC-B-S007	Total/NA	Solid	Dry and Grind	
160-30103-8	PE2-RSYB2-DC-B-S008	Total/NA	Solid	Dry and Grind	
160-30103-1 DU	PE2-RSYB2-DC-B-S001	Total/NA	Solid	Dry and Grind	

**Prep Batch: 382055**

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-30103-1	PE2-RSYB2-DC-B-S001	Total/NA	Solid	Fill_Geo-21	381621
160-30103-2	PE2-RSYB2-DC-B-S002	Total/NA	Solid	Fill_Geo-21	381621
160-30103-3	PE2-RSYB2-DC-B-S003	Total/NA	Solid	Fill_Geo-21	381621
160-30103-4	PE2-RSYB2-DC-B-S004	Total/NA	Solid	Fill_Geo-21	381621
160-30103-5	PE2-RSYB2-DC-B-S005	Total/NA	Solid	Fill_Geo-21	381621
160-30103-6	PE2-RSYB2-DC-B-S006	Total/NA	Solid	Fill_Geo-21	381621
160-30103-7	PE2-RSYB2-DC-B-S007	Total/NA	Solid	Fill_Geo-21	381621
160-30103-8	PE2-RSYB2-DC-B-S008	Total/NA	Solid	Fill_Geo-21	381621
MB 160-382055/1-A	Method Blank	Total/NA	Solid	Fill_Geo-21	
LCS 160-382055/2-A	Lab Control Sample	Total/NA	Solid	Fill_Geo-21	
160-30103-1 DU	PE2-RSYB2-DC-B-S001	Total/NA	Solid	Fill_Geo-21	381621